

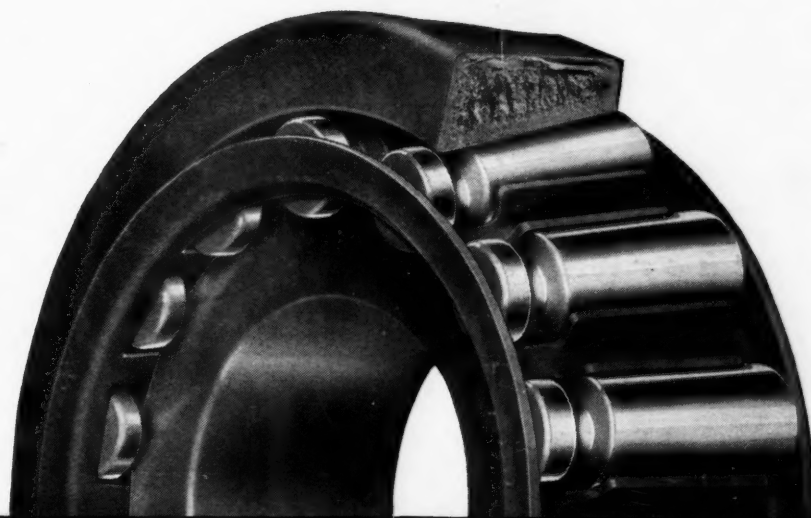
# AUTOMOTIVE INDUSTRIES

## The AUTOMOBILE

Vol. XLV  
Number 20

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NEW YORK, NOVEMBER 17, 1921

Thirty-five cents a copy  
Three dollars a year



Conservación de fuerza es uno de los rasgos característicos en cuanto a utilidad de las Chumaceras Cónicas de Rodillos Timken. Ellas evitan grande y frecuente lubricación y, debido a su propio diseño, las ensambladuras de chumaceras resultan más livianas y compactas.

Conservation of power is but one phase of the utility of Timken Tapered Roller Bearings. They eliminate the frequent lubrication bug-bear; and by their very design make possible lighter and more compact bearing assemblies.

The original Spanish, and the American translation, of a Timken Bearing advertisement printed in *Automovil y Sports* of Buenos Aires

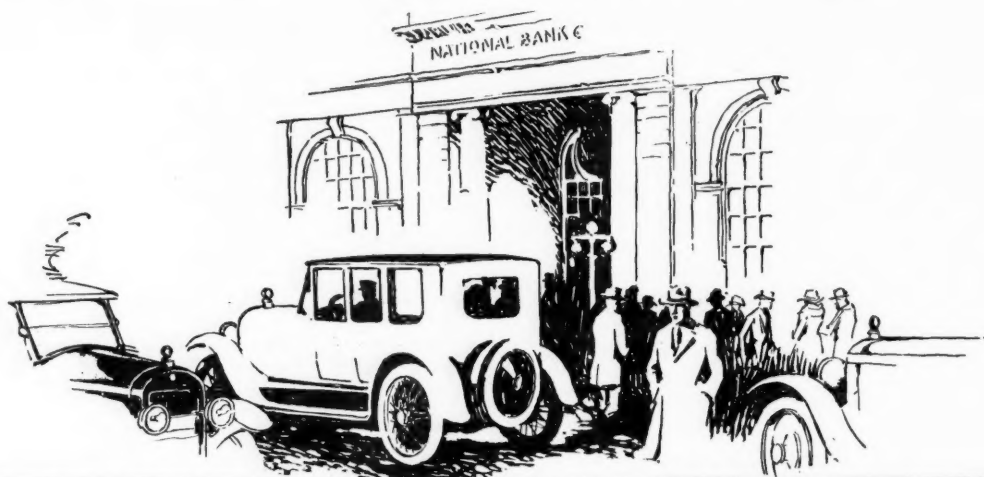
THE TIMKEN ROLLER BEARING CO, CANTON, OHIO

Timken Tapered Roller Bearings for Passenger Cars, Trucks, Tractors, Trailers, Farm Implements, Machinery, and Industrial Appliances

# TIMKEN

## *Tapered*

# ROLLER BEARINGS



# Conservation of Capital

## *Another Reason for Concentration in Buying*

The expenditure of vast sums of money for surplus stocks is inevitable today in the successful manufacture of motor cars.

Many executives, however, have greatly decreased such expenditure through concentrating their purchases in one source of supply.

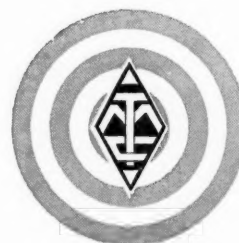
One item of expense that may be materially lessened through centered buying is the purchasing of automobile body hardware *exclusively* from Ternstedt.

Ternstedt Equipment is delivered to your door just as you require it. All units, being of standard design, you have waiting at the Ternstedt plant an immense reserve, instantly ready at your call. There is apparatus for every possible need.

As you pay for Ternstedt Hardware only as you receive it, capital, ordinarily invested in heavy surplus stocks, is released for other purposes. The saving is quickly apparent.

Those who have become familiar with this and the many other advantages of concentrating in Ternstedt are specifying Ternstedt Hardware *exclusively*. The list is large and rapidly growing.

Ternstedt Manufacturing Company  
D E T R O I T



Trade Mark Registered

**Concentrate on  
Ternstedt Products**

Window Regulators  
Curtain Rollers  
Sunshades  
Open and Closed Body Door  
Locks  
Door Panels  
Door Bumpers  
Anti-rattlers  
Windshield Wipers  
Windshields  
Window Sash  
Strap Hinges  
Concealed Hinges  
Piano Hinges  
Rear Deck Hinges  
Rear Deck Locks  
Rear Deck Lid Braces  
Channel and Shapes  
Screw Machine Products  
Die-Castings  
All kinds of Stampings  
Other Miscellaneous Auto-  
mobile Hardware

# TERNSTEDT

## *Automobile Body Hardware*

... BUILT · BETTER · FOR · BETTER BODIES ...

LARGEST MAKERS OF AUTOMOBILE BODY HARDWARE IN THE WORLD

# AUTOMOTIVE INDUSTRIES

## The AUTOMOBILE

VOL. XLV.

NEW YORK—THURSDAY, NOVEMBER 17, 1921

No. 20

## Statistics for Use in Making Sales Plans

Here is statistical data never before available. More detailed material will follow. This article discusses the use of such information and general trends in the passenger car field. Industry shown to be on sound basis for future progress.

By Norman G. Shidle

**T**HE marketing problem of the automotive manufacturer divides itself in a general way into two parts and in working out that problem studies are likely to follow two general lines. The first of these consists of the principles of marketing which underlie all sound procedure. In this field might be included all those studies designed to lay out the various factors involved in automotive marketing, to determine the relation between these various factors, human, statistical and economic, the unit cost of marketing, and the other fundamentals upon which rests the development of effective practice and performance.

These form a basis, and current marketing discussions in AUTOMOTIVE INDUSTRIES are designed to contribute constructive thought along these lines. In addition to such fundamental studies, however, another phase of marketing must be considered which includes the assembling and proper interpretation of actual facts as regards the industry and its marketing possibilities. This includes the development of accurate statistical data, compiled to aid in the solution of definite selling problems.

Such accurate data is extremely difficult to obtain concerning the automotive industry, as has been

pointed out before, yet once compiled and properly utilized by individual firms within the industry it might materially reduce marketing costs and greatly aid the return to a strong economic position.

In connection with statistical data concerning the automotive industry then, there are two major requisites:

1. Statistical data must be accurate.
2. It must be sanely interpreted, due emphasis being given to factors affecting the situation which cannot be reduced to statistical form.

These requisites cannot be fulfilled except through very extensive and careful research and through an intelligent and analytical consideration of the results of such research.

Such data as regards certain phases of the automobile industry, AUTOMOTIVE INDUSTRIES is able to present for the first time.

For marketing purposes it is essential that all material be presented in segregated form, since the marketing of each kind of automotive vehicle constitutes a problem in itself. General data concerning a given type of vehicle will enable the manufacturer to visualize the present condition and future possibilities of the industry as a whole and to discuss intelligent-



ly what is likely to happen during the next few years.

With this general picture as a background he will want more detailed data concerning the developments within his particular price class, in given sections of the country, etc. Upon the basis of these more detailed statistics he will be able to analyze the market for his own particular product more accurately and to direct his sales effort more efficiently.

Within the scope of a single article only one of these phases can be adequately discussed. The charts presented here are designed to show what may reasonably be expected in passenger car sales, production and registration during the next two to five years. The information presented by the charts is valuable because of the accuracy of the figures used and because of the soundness of the basis upon which the moderate predictions are made.

It is important that the basis upon which the figures were compiled and the charts drawn be thoroughly understood before any attempt to interpret the results is made. This is true because no intelligent interpretation of any set of figures or charts can be expected unless the details of the statistical work are understood.

All interpretations of statistical work are not sufficiently concerned with this phase, and as a result statistical data of some relative value has been misinterpreted in the past. Considerable harm can accrue both to an industry and to an individual marketing plan through a hasty interpretation of statistical results which fails to consider the factors involved in the statistical work.

The charts presented here have to do specially with the passenger car part of the automotive industry. The first chart shows passenger car production figures, and the second chart passenger car registration figures. The first is merely a general progress curve designed to show the trend of any industry over the three periods of its development.

Mr. Prescott's explanation of the bases upon which these results were built up follows:

The growth of population of all countries as well as their economic activities, i.e. farming and industry, all extractive industry excepted, seem to follow a defined growth which passes through four stages in the course of its progress. These four stages are: period of experimentation, period of growth into social fabric, through point of "Diminishing Returns," into period of stability. Knowing the fundamental curve of growth that industry seems to follow with uncanny accuracy, it is not difficult to conceive that when one part of that growth is known the other can be forecast. To explain past performance and predict the future are not different operations. They are the same operation but working in opposite directions, one from effect to cause and the other from cause to effect.

During the period of experimentation, the permanent success of an industry is doubtful, because man is a creature of habit. It is difficult to change him from the

groove in which he is traveling. He accepts very slowly anything that tends to change his routine. The success of this industry depends upon how well the opposition habits of man are overcome.

If the industry successfully overcomes this opposition it enters the next period of growth into social fabric; if not, it fails. In this period the development of the industry is slow or rapid, depending upon how well the opposition is overcome. Sooner or later, if successful, the industry will pass through point of "Diminishing Returns," that is where its growth increases but at a diminishing rate.

It then enters the period of stability where it adjusts itself and becomes a part of the social and economic life of that country. To study and measure the growth of various economic activities, it is necessary to have a clear conception of what constitutes and influences this growth.

Every industry is comprised of many individuals that

produce, distribute and use the product, varying from small industries having only a few to large industries with national distribution having several million.

All these individuals exert some influence on the growth of the industry. Some of these influences are favorable or plus, while some are unfavorable or minus. It is the summation of these individual plus and minus influences that determines the progress of the industry. The influences may be grouped as internal and external. The internal may be controlled to a large extent, but the favorable external factors have to be created by strong internal influences. Internal favorable influences are comprised of capable executives that build up strong organizations for

producing and marketing the product, which are reflected externally in policy, good will and competition. These influences are measured in the volume of business, whether it is units of production or value of product. This history or progress may be shown graphically by the curve in Fig. 3 that seems to be fundamental for all industries that are a direct or indirect function of population. As every industry has many different influences, so every industry will have a different rate of growth, but the trace of the curve will be the same.

As the record of past performances is the history of that industry, it is necessary to have these records accurate and as complete as possible, in order that accurate results can be obtained from the use of the equation designed to measure the past and predict the future of industries. This equation, used in constructing the accompanying charts, was tested on cotton, railroads and pig iron. It forecast in the case of cotton the probable production of cotton thirty years in advance with an error of 2 per cent; in the case of railroads twenty years in advance with an error of 3 per cent; and in the case of pig iron, ten years in advance with 3 per cent error. All of these activities can furnish accurate data for a long period. It is hardly to be expected that the data of the automobile industry, which is for a very short period and of a very uncertain nature, can be fore-

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**C**ONSIDERABLE space has been given here to an explanation of the basis and compilation of the statistics upon which the conclusions have been drawn. This explanation is important, since it forms a basis, not only for the material presented here, but also for future marketing statistics which will appear in coming issues. Conclusions drawn from statistical data are valuable only in so far as the basis of the data is understood, and the limitations as well as the value of the material considered.

Accurate statistics concerning certain phases of the automotive industry are not yet available. But accurate material concerning many phases has been developed by Raymond B. Prescott of AUTOMOTIVE INDUSTRIES Research Staff as a result of many years' careful study, analysis, and investigation and can now be given to the industry.

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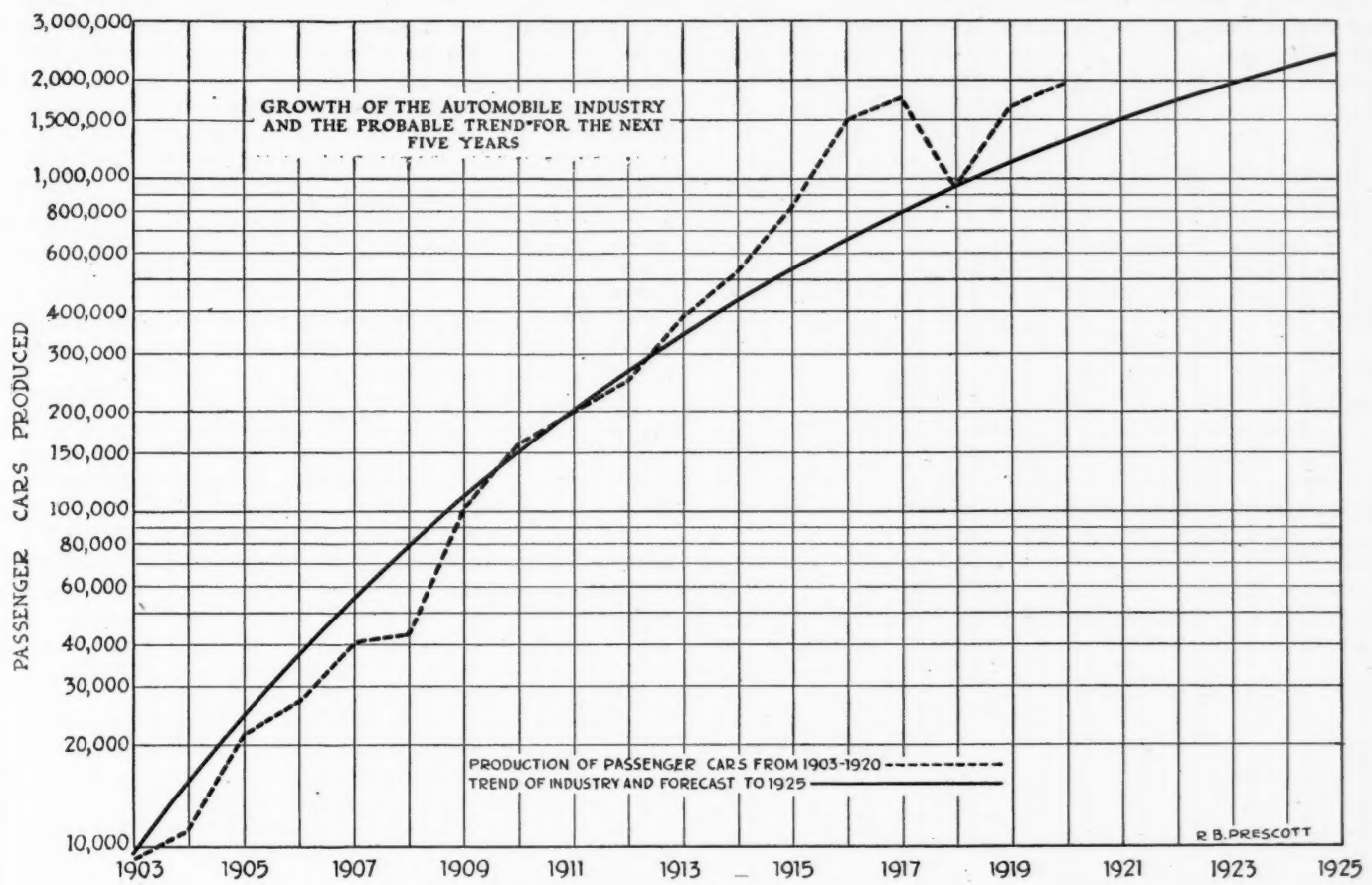


Fig. 1

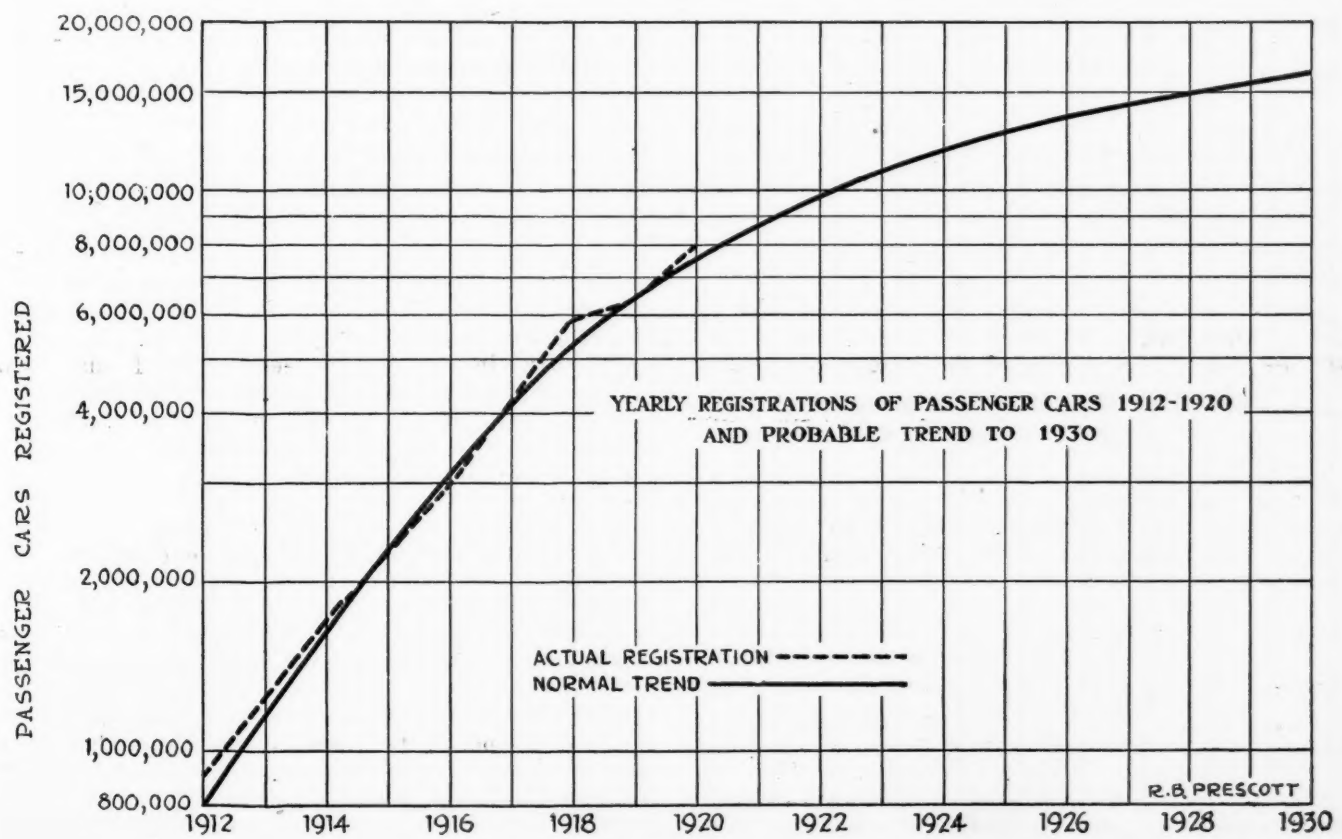


Fig. 2

cast as accurately as the above. But the absence of accurate data over a long period does not preclude the use of mathematical analysis as a tool in anticipating the future trend.

The equation that has been fitted to the data mentioned above, with the results given, is as follows:

$$(1) y = ab^{cx}$$

$$(2) Y = A + c^x B$$

Let now  $x$  become successively  $x_1, x_1 + 1 + \dots + x_1 + n - 1$ .

Then taking the sums we get

$$(3) \sum_{x=x_1}^{x_1+n-1} Y = nA (c^{x_1} + c^{x_1+1} + \dots + c^{x_1+n-1}) B$$

The series of  $c$  is in geometrical progression. Such a series is

$$S = \alpha + \alpha\beta + \alpha\beta^2 + \dots + \alpha\beta^{n-1}$$

$$\therefore \beta S = \alpha\beta + \alpha\beta^2 + \dots + \alpha\beta^{n-1} + \alpha\beta^n$$

$$\therefore S(1 - \beta) = \alpha(1 - \beta^n) \text{ and}$$

$$S = \alpha \frac{(1 - \beta^n)}{(1 - \beta)}$$

Consequently the sum of the  $c$  series is

$$S = c^{x_1} \frac{(1 - c^n)}{1 - c} = c^{x_1} \frac{(c^n - 1)}{(c - 1)}$$

and we may write (3)

$$(4) \sum_{x=x_1}^{x_1+n-1} Y = A + c^{x_1} \frac{(c^n - 1)}{(c - 1)} B$$

This equation (4) will enable us to find the constants in the formula.

There are three constants in the equation, and we therefore need to have three simultaneous equations. If we divide up our observations into three equal parts we have, using equation

$$(4) \sum_{x=x_1}^{x_1+n-1} Y = nA + c^{x_1} \frac{(c^n - 1)}{(c - 1)} B$$

$$(5) \sum_{x=x_1+n}^{x_1+2n-1} Y = nA + c^{x_1+n} \frac{(c^n - 1)}{(c - 1)} B$$

$$\sum_{x=x_1+2n}^{x_1+3n-1} Y = nA + c^{x_1+2n} \frac{(c^n - 1)}{(c - 1)} B$$

Differencing both sides of these equations, we get

$$\sum_{x=x_1+2n}^{x_1+3n-1} Y - \sum_{x=x_1+n}^{x_1+2n-1} Y = c^{x_1+n} \frac{(c^n - 1)^2}{(c - 1)} B$$

$$\sum_{x=x_1+n}^{x_1+2n-1} Y - \sum_{x=x_1}^{x_1+n-1} Y = c^{x_1} \frac{(c^n - 1)^2}{(c - 1)} B$$

These two equations may be written

$$(6) \Delta \sum_{x=x_1+2n}^{x_1+3n-1} Y = c^{x_1+n} \frac{(c^n - 1)^2}{(c - 1)} B$$

$$\Delta \sum_{x=x_1+n}^{x_1+2n-1} Y = c^{x_1} \frac{(c^n - 1)^2}{(c - 1)} B$$

Now dividing both sides of the first equations in (6) by the corresponding side of the second equations in (6) we get

$$\frac{\Delta \sum_{x=x_1+2n}^{x_1+3n-1} Y}{\Delta \sum_{x=x_1+n}^{x_1+2n-1} Y} = c^n$$

Take the logarithms of both sides

$$(7) \log \Delta \sum_{x=x_1+2n}^{x_1+3n-1} Y - \log \Delta \sum_{x=x_1+n}^{x_1+2n-1} Y = n \log c$$

Equation (7) enables us to compute at once the value of  $c$ . We may then find  $(b)$  from either of the equations in (6). Finally  $A$  may be obtained from (2).

Note.—As far as the writer has been able to learn this equation has never been fitted to economic data before.

The above equation is a method or tool of forecasting and it is not put forward as a "Cure All," but is simply an improved method over the present unscientific ones used to-day. The equation will not forecast abnormal economic or social eruptions any more than any business executive can predict fires, strikes or destructions of his plant by the elements, but it seems to predict with uncanny accuracy the Law of Growth of industries that are a direct or indirect function of population. Marshall ably said: "History tells of sequences and coincidence, but reason alone can interpret and draw lessons from them." This equation as fitted to data of the automotive industry should make it far less difficult for the executive having intimate knowledge of that particular activity to shape his policies several years in advance with a high degree of accuracy.

The data used to fit the equation has been carefully computed from confidential figures collected after years of close association with the industry. It is as nearly correct as it is humanly possible to obtain at the present time.

The registration figures for passenger cars have been obtained from an actual count of registration records of the various states. Even this method involves slight inaccuracies under present registration conditions, but the factor of error is less than 1 per cent so that the figures can properly be used for purposes such as this.

This is not true as regards truck figures, however, at the present time. This may be explained as follows: Those states which do not segregate in any way cars and trucks—and there are still about 15—list the name of the vehicle without designating its type. In the case of those firms which make both cars and trucks, it is impossible to determine, even from an actual count on the records, the exact division.

Consequently, the passenger car figures include those trucks in the states where there is no segregation which are made by concerns manufacturing both cars and trucks. But these trucks are so small a percentage of the total passenger car registration that they do not affect the resulting figures.

The only truck figures available, on the other hand, include merely those trucks made by companies which manufacture only trucks. These figures would not include those trucks made by companies which also manufacture passenger cars. In this case the trucks made by companies which also make cars form so large a percentage of the total truck registration as to affect the results very materially. Hence, truck studies similar to the passenger car studies presented, are not possible at the present time.

The figures are not available from any total registration figures that are now published, since they are subject to many errors owing to the many methods of classifying motor vehicles in the states.

This explanation indicates that these charts have been built up on a fundamentally sound basis, and that they can be relied upon as picturing accurately the probable development of the passenger car industry during the next three to five years. It is not claimed that the figures are exact to the last degree. The figures themselves, however, and the basis upon which they have been compiled are sufficiently accurate to reduce the possible error to one or two per cent for the period covered, provided no unusually abnormal factor, such as the war, enters.

With this thought in mind, it is possible to intelligently study the charts and the results which they give.

It is recognized everywhere, of course, that every industry in the country was given an abnormal impetus by the



demands of the war. Production capacities in all industries increased as much during the years of this abnormal condition as they normally would have done in twice or three times as long under normal conditions. Thus, to say that the automobile industry has piled up a production capacity in excess of its immediate needs, is merely to state an obvious fact that is true of every other industry.

A close analysis of the charts, however, indicates that the passenger car industry, despite the rapid increase during the war period, has not taken nearly so great a deviation from normal as have many other similar industries.

Assuming for the purposes of discussion that "normal" may be defined as a period in which the industry is producing at a rate equal to the highest production point it has yet reached. On this basis, it appears that it will take two years for the passenger car industry to return to "normal."

The highest production reached by the passenger car manufacturers was slightly under 2,000,000 in 1920. This is less than 500,000 over what the normal production would have been for 1921, had there been no artificial acceleration due to the war. It is about 200,000 more than the normal for 1922 would have been.

And it is just the same as the normal for 1923.

That is, if the industry is not interrupted by any abnormal disturbances during the next two years, it will be back to normal by 1923. This is a decidedly encouraging outlook, since the definition of normal used in this discussion means that practically every passenger car plant in the industry will be going full blast, provided the production capacity remains at its present level. This proves the automobile industry to be in a favorable, rather than an unfavorable, position as compared with many other industries which may properly be compared with it. It refutes the prophets who have seen catastrophe ahead for the automobile industry.

This optimism is particularly sane, when it is realized that it is not necessary for every plant in the industry to be producing at 1920 capacity rate in order that there be a good profit available. Producing at the rate shown to be possible by this curve, it appears that there is an excellent business available during 1921 and 1922, even though 100 per cent production is not warranted during that time.

It is evident that the measure of soundness and prosperity of the industry is in direct proportion to the distance between the normal trend line and the actual production or sales line. This distance was less in 1920 than it was in 1917. Fundamentally the passenger car industry is more sound and on a better basis than it was during the boom period of 1917, and is rapidly returning to normal.

The registration curve shown in Fig. 2 is of special interest since it shows how closely the actual registrations in the past have coincided with the predictions of this normal trend curve. This appears to be true in spite of the abnormal conditions caused by the war and the present business depression. The variation between the normal and the actual in this curve is less than in the production curve partly because the numbers involved in the calculation are considerably larger, thus reducing the percentage of error. For this same reason, the deductions of this curve may be accepted as accurate some years further in the future.

This chart shows that in 1923, the year in which the in-

dustry is scheduled to be back to normal, the registration will be in the neighborhood of 17,000,000 passenger cars. The registration predicted by this normal curve for 1921 is about 8,700,000 passenger cars. It will be interesting to observe how close to this predicted figure are the passenger car registrations for 1921.

It is obvious that the per cent of increase in registration must become less very soon, yet the curve shows that there will be a material increase in actual registration for some years to come, and that the much talked of saturation point is not yet visible. In making the interpretation, attention should again be directed to the basis upon which the normal curve has been constructed, since it is only the soundness of that basis that renders the information valuable.

It is interesting to compare the variation from normal which the war gave to the automobile industry with similar effects in similar industries. The best available figures, for instance, as regards the talking machine industry indicate that its abnormal expansion or variation from normal is very materially greater than that of the automobile industry. This is found to be the case in numerous other instances.

A survey of comparable industries, in fact, indicates that the position of the automobile industry, as regards getting back to normal, is better than many others.

There may be some objection to the conclusions drawn here on the basis that the highest production capacity reached by the passenger car industry is not identical with the production capacity of the industry. This is a theoretical rather than a

practical criticism, since the passenger car industry from a business point of view was considered throughout the country to be working at "capacity" during the year its peak production was reached.

Production capacity, in any case, is difficult to define in a theoretical sense. It cannot properly be said to include buildings owned by manufacturers which have never been equipped for actual production, but have simply been acquired for purposes of future expansion or development.

To refer again to the curve of passenger car registrations shown in Fig. 2, it is interesting to note how closely the normal trend curve coincides with the actual registration curve, in spite of the abnormal business conditions which have prevailed during recent years. While it becomes apparent that the rate of increase of registration during the next ten years will be considerably less than during the previous ten years, it is evident also that there will be a definite increase nevertheless.

Not only will production facilities be needed to take care of that development, but also service must be improved and developed, thus broadening the wide scope of business growth that may be expected in the automotive industry during the next decade. The industry is entering upon its period of stability. The automobile has become a fixed unit in the life of the people.

The automobile industry thus appears to be on a sound basis. It is rapidly returning to normal, gives evidence of an excellent market in the immediate as well as in the more remote future, and has an opportunity to do an excellent business, profitable to the vast majority of firms, during the two years which will be needed to return to normal.

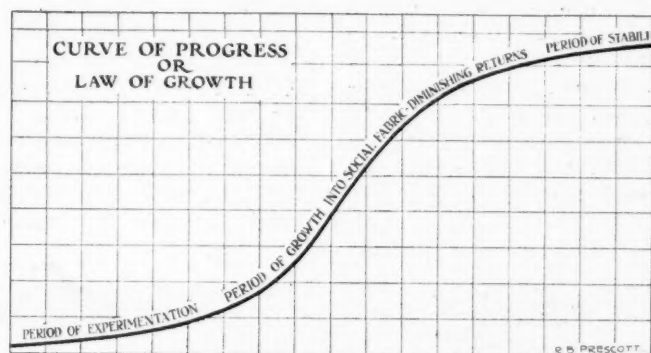


Fig. 3

## Closed Body Production Costs Minimized in Essex Coach

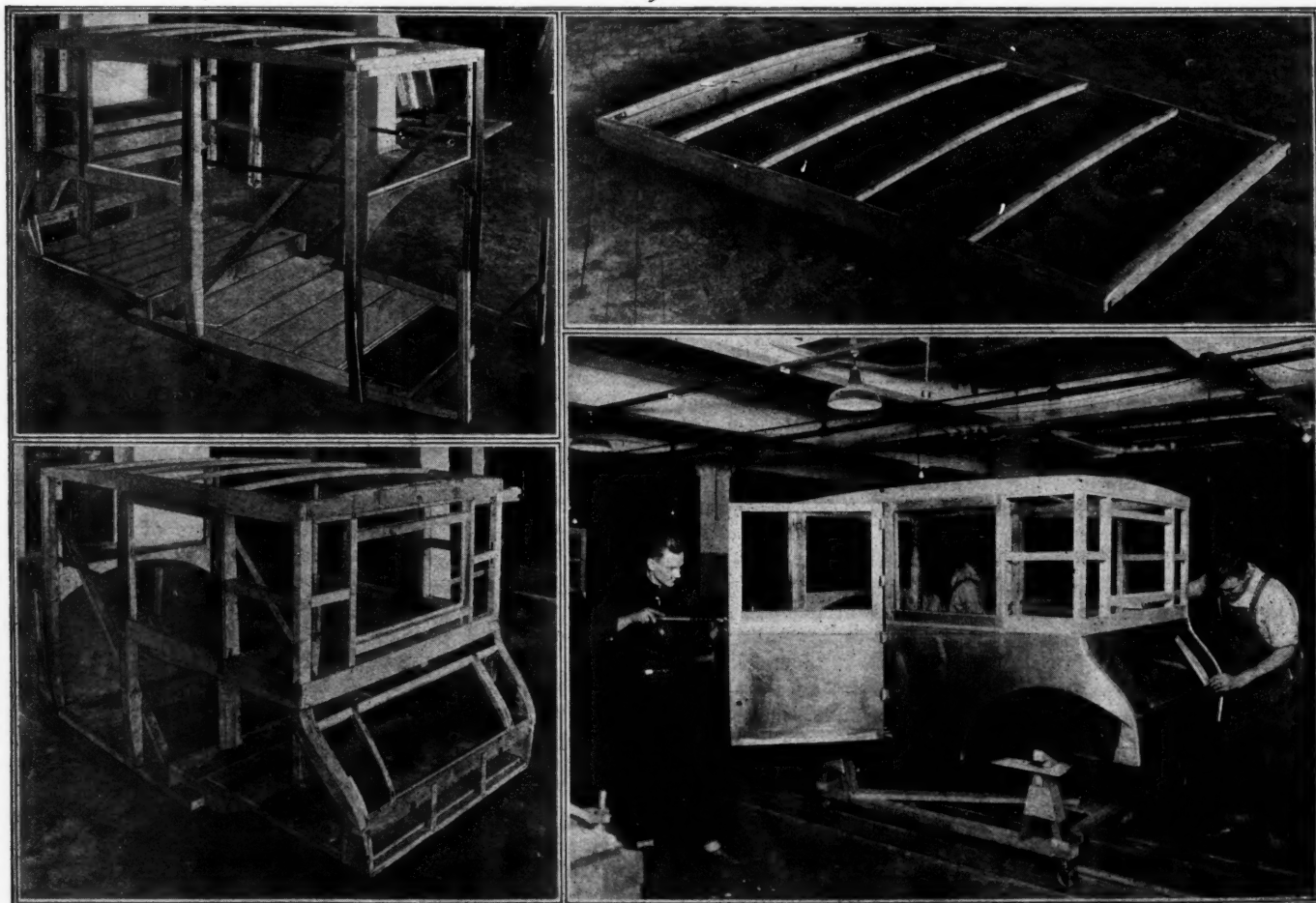
Use of straight-cut lumber, two doors and felt window runners assist in making it possible to produce a five-passenger closed car to sell at only \$300 more than open body on the same chassis.

By J. Edward Schipper

**T**HE new Essex Coach, which is to sell at the unusually low price of \$1,495, has just been put in production. It incorporates a number of economy features in closed body construction. The price, which is \$500 below that of the sedan and but \$300 more than the touring car, indicates that something has been done to cut the cost on this body, and a large part of the secret lies in the practical elimination of curved pieces of wood. Substantially all pieces of wood in the body framing are cut on straight lines. This not only materially reduces the cost in preparing the wood framing for assembly, but also, in a number of instances, has resulted in making the assembly work much easier and far more readily handled on an interchangeable basis. An additional saving has been made in the use of two in place

of four doors. This has been made possible by the adoption of individual Pullman-type seats in front in place of the usual fixed type. These seats fold out of the way to allow access to the rear seat. The car is a five-passenger design. The rear seat is continuous across the body in the usual way.

The usual window runners have been eliminated and in their place the felt liners which are old in coach work, have been employed. The glass operates between two fixed lining strips of felt. These not only assist in supporting the glass, but also serve to prevent rattling. The window regulators are of the Dura skew gear type with a worm for the actual lifting of the windows. The crank operates the worm through the medium of the skew gears.



Some steps in the body assembly department at the Essex plant, showing framing for Essex Coach body, note practical elimination of all but straight pieces. The framing for roof is unusually simple. The lower body panels are covered with pressed steel on weather exposed surfaces

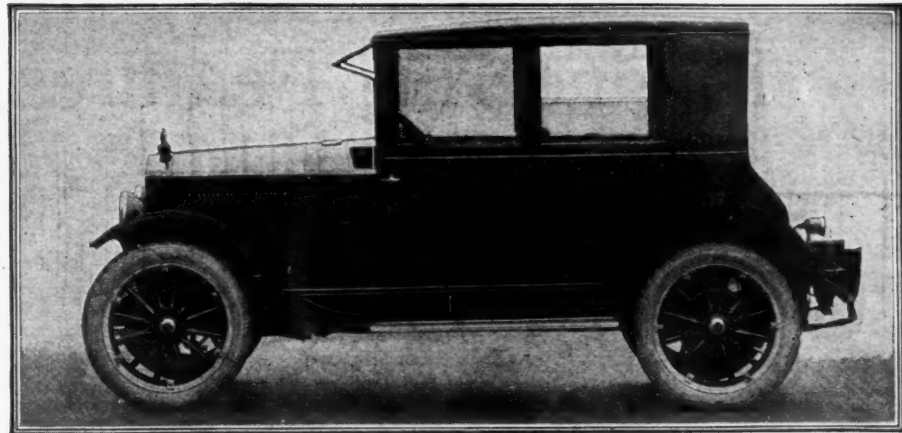


The type of body construction employed is such that it is possible to put it together in a number of sub-assemblies. The body may truly be said to be assembled instead of built up in the usual way. There is no great amount of tacking to be done from the inside of the body. This can practically be all done before the body is put together. The roof furnishes a good example of this method of construction. The entire roof is practically a sub-assembly. It is a soft type covered with artificial leather. The actual ceiling of the car, or, as it known, the roof lining, is stretched across the top of the body before the roof proper is put on. This permits of tight fitting and does away with a good part of the usual interior tacking and trimming work. The roof is then put on over the top of this lining as an independent assembly.

Additional economy has been secured by making as many parts on the body of the same dimensions as possible. For instance, all four window frames are of the same size. This also means that the four pieces of glass for the side windows are identical and, consequently, there is no fitting of left and right in putting the body together.

All of the plaited upholstery is detachable. The upholstery is a wool cloth with plaited back and seat cushions in the rear seat.

A sales executive of the Essex company states in exhibiting the coach:



New Essex coach seating five passengers which sells for \$1,495

"The idea behind this car has been to produce a good quality job without going to expense to carry out some of the details in coach work which are more the results of precedent than of necessity or even ornamentation. For instance, instead of going to considerable trouble and expense to cover the heads of the screws, all of the screw heads are exposed. While the manufacturer of an expensive custom body would not tolerate this type of construction, it can be stated that it is far from displeasing to the eye and certainly results in considerable saving in manufacture, which, of course, is what has been aimed at in this body, in which an attempt has been made to provide a closed body at open body figures. The finish has not been slighted as there are twenty-five paint operations, this being fully up to the normal number."

## Cooperation Between the Sales and Accounting Departments

THE gradual return of good business is calling more and more for close cooperation between all the departments of an industrial or business organization. The present time is a splendid one to harmonize effort and every man in industry should be called upon to give his business associate the best he has, and ask from him in return, his best.

These facts, along with many others, were brought out in a paper presented by S. B. Taylor, General Sales Manager of the S.K.F. Industries, before the national conference of the Industrial Cost Association recently held in Pittsburgh. The title of Mr. Taylor's paper was, "What the Sales Manager Should Have from the Accounting Department."

Actual working contact between the accounting and sales departments starts with costs. Cost figures are of prime importance in merchandising and should always be made available. Current information should also be supplied on "In Process" material, including the quantities involved, as well as the stage of manufacturing process.

Certain data giving pictures of sales results should also be made available to the sales department, and Mr. Taylor outlined some of these as follows:

A daily memorandum showing the number and value of orders received, together with the number of units covered, and from what plants ordered; a similar memorandum detailed by customers, with quantities and type of purchase; a weekly report giving all sales, all returns and allowances for the period and to date, the status of unfilled orders and the value of new business accepted, and a monthly report showing the gross profits for the month

with comparisons for the same period of the preceding year.

The proper allocation, through coding, of sales by territory and by industry—assuming distribution to be varied—is an important responsibility of the comptroller's department. Correctly done, it forms a record from which the sales executive may learn much as to the ability of fields to absorb product and the desirability of such a field from the standpoint of profit, to note improvement or retardation as it occurs, also to judge more fairly if various territories, in which there is a common field for sales, are bearing their respective part of the burden.

There were other items which Mr. Taylor said he believed could be used advantageously by the sales department, but he pointed out that different conditions of business called for different plans of operation. The outstanding feature of such practice, however, is to establish a closer relationship between the two departments, and through cooperation develop more sales.

A SECOND edition of the *Aircraft Handbook* by Fred H. and Henry F. Colvin has recently been published. The new edition contains considerable new material, while much of the old text has been revised. The book is designed to aid mechanics in becoming familiar with the various phases of aircraft construction and repair. It begins with a general discussion of airplane theory and construction, and goes on to discuss in detail the best known motors. Space is also given to air laws, landing fields, S. A. E. airplane standards and nomenclature. The volume is published by the McGraw-Hill Book Company.

# Engineering Features of British Truck Models

New designs include both light and heavy trucks and a chassis built for omnibus work is a feature of the Dennis factory's products. In Maudslay 6-ton model, the driver's seat is alongside instead of over engine. This article includes descriptions of the new models of seven manufacturers.

By M. W. Bourdon

**M**ANY British manufacturers of trucks exhibited new models at the recent Olympia show, and while there were not many radical departures from custom in their design, various changes which the manufacturers believed will work for the better were noticed. At least one manufacturer of passenger cars has entered the truck field.

One of the new models shown was the new 6-ton\* Maudslay, which has a bigger area of load platform than any other British truck, and is of what has become known as the over-type, though it has the driver's seat alongside instead of over the engine. The steering wheels and controls are on the right, and there is a helper's seat on the left of the engine bonnet. Behind the driver's seat the load platform extends for 19 ft. 6 in.—this on a wheel-base of 14 ft. 6 in.

This new model has a straight channel section (6 x 2½ in.) rolled steel frame with the open side of the channel outward, the overhang beyond the rear axle being approximately 9 ft. In addition to rolled steel cross members at both ends, there are five tubular intermediate cross members, four being of 3-in. diameter and the other of 2½-in. The radiator is at the extreme front end of the frame, and close up behind it is the four-cylinder 4¾ x 6 in. engine which has overhead valve and camshaft, block-cast cylinders and a detachable head.

Maudslay's have always had an overhead camshaft, but in the means of operating it, in the arrangement of the valves, and in having a detachable head and block cylinders there are divergencies from past practice. The inlet valves are seated in cages, but the exhausts have their seats directly in the cylinder head, being removed if necessary through the inlet ports.

The overhead camshaft is driven from the rear end of the crankshaft by bevel gearing, the crankshaft pinion being secured by the same bolts and flange as the flywheel. Half way up the vertical shaft is bevel gearing driving a transverse shaft for the water pump on the left and the magneto on the right, the latter when the body is in position coming under the floorboards of the driver's seat. The pinion at the top of the vertical shaft is driven through a dog clutch, this arrangement allowing the camshaft with its bearing brackets to be lifted out after the holding down bolts have been removed. The camshaft operates the valves through tappets.

The aluminum induction manifold on the right of the cylinders has a very large water jacket. A Zenith carbureter is standard. Aluminum is also used for the two-part crankcase, in the upper half of which the crankshaft has three bearings. Four-bolt big ends are used,

as are hour-glass, cupped head pistons with three rings. Engine and gearset are separately mounted in a four-point suspended sub-frame. The main frame is only 36 in. wide and has the steering gear-box bolted to the extreme front end on the right, with the drag link running back to the swivel arm. The shaft of the clutch, brake and throttle pedals is carried by a single bracket projecting from the outside of the frame just in the rear of the steering box; slightly further to the rear, on the inside of the frame, are the gear lever gate and hand brake quadrant.

A cone clutch is used, whence a coupling shaft some 42 in. in length runs back to the gearset with an internal and external pinion type of semi-flexible joint at each end. Four speeds are provided with ball bearings for all shafts, and a plain bush for the pilot. The open propeller shaft has a star joint at the front and pot (sliding block) joint behind.

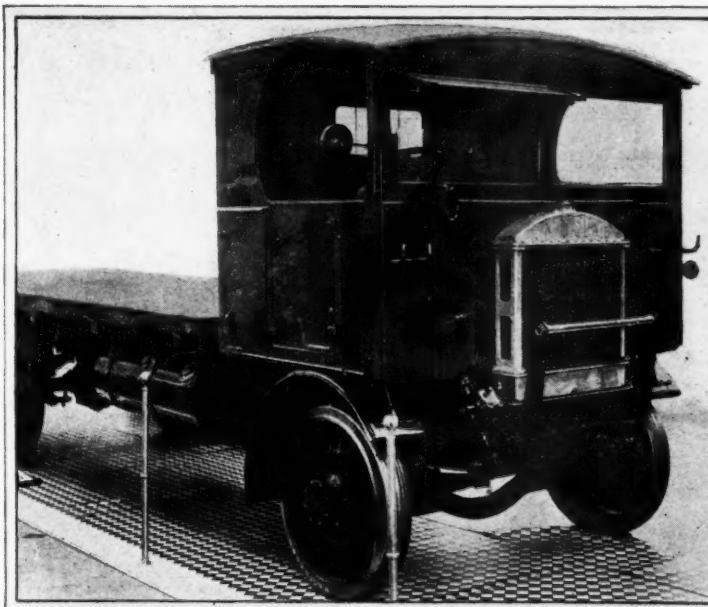
Double reduction gearing forms the final drive, the main axle unit being a horizontally arranged double banjo forging, with an aluminum sump and the whole of the gearing carried by an aluminum top section with a pilot extension the full length of the forging ring. The side extensions of the latter are of square section and have the spring and brake shoe brackets clipped on. Straight roller bearings with ball thrusts are used throughout the axles and wheels. Central vertical steering pivots are used, a point of design which was found in one Maudslay model before the war, but was dropped for a time. To secure this feature the hollow stub axle is belled out to 7½ in. diameter at the inner end, to accommodate the end of the beam axle and the swivel pin; this necessitates a very large hub and an inner roller bearing of 10 in. outer diameter—an expensive job, but resulting in easy steering. Brakes consist of a shoe type behind the gearset and expanding shoes in the rear wheel drums 24 in. in diameter and 4 in. wide on their friction surfaces, the shoes being cam-operated. The chassis is priced at £1,275.

The 3 (long) ton Maudslay is also a new model, but only so in respect of the driver's position, who is now also placed alongside the engine on the right. In its general lines the 3-tonner resembles the other, but the overhead camshaft drive is somewhat different. The vertical shaft is *in front* and is driven by helical gearing at top and bottom; the magneto is alongside the crankcase on the right and the pump is driven by belt from the front end of the crankcase. The pump has a distinctly unusual position, for it is bolted to the left-hand corner of the radiator, extending rearwardly. This engine has a bore and stroke of 4½ x 5 in. and the chassis sells at £1,000.

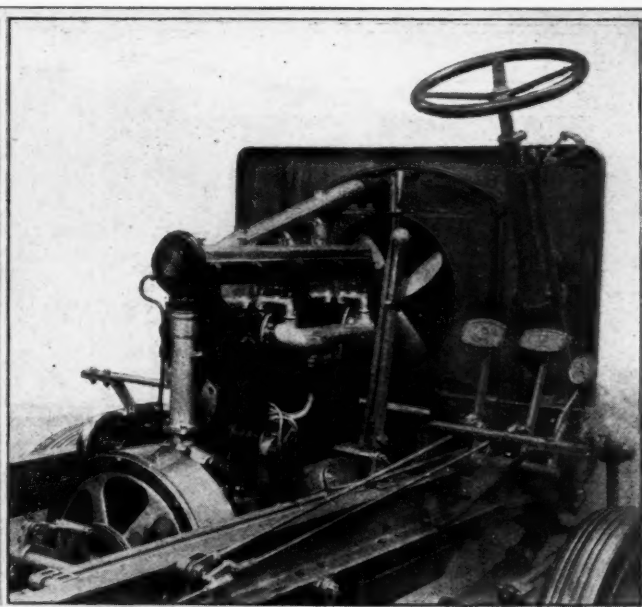
Hitherto the maker of the Guy truck has specialized on a 2½-3 ton chassis, but he has now introduced two

\*All tons referred to in this article are long tons of 2240 pounds, in accordance with prevailing English truck rating practice.





Front end of Maudslay 6 ton semi overttype truck.  
Note gasoline tank alongside frame



Engine and controls of new Maudslay truck. Engine has overhead camshaft, detachable head and block cast cylinders

new models, one of which is for 4500 lb. loads and has the same engine as the original type except that thermosyphon circulation is used. Gear-box, axles and other main parts are the same, but the frame and springs are shorter and lighter.

The other new model is an entirely fresh design and is a type which British makers have hitherto neglected, viz., a  $1\frac{1}{4}$ -ton chassis for fast delivery work. This chassis attracted an immense amount of interest among dealers and potential purchasers alike, not only by reason of its engineering features and general design, but also on account of its low price, viz., £395. This compares favorably with the prices of most American truck chassis of similar capacity sold in England. It is an exceedingly well finished job.

The  $3\frac{1}{4} \times 4\frac{1}{2}$ -in. four-cylinder block-cast engine is assembled as a unit with clutch pitch and gearset. The aluminum two-part crankcase is suspended from the main frame by two arms approximately midway of its length, while at the rear of the gearset the unit is slung in two trunnion bearings in a swinging bracket depending from a tubular cross member. The valve arrangement is on the lines of the larger engine described in detail in *AUTOMOTIVE INDUSTRIES* of Oct. 2, 1919.

The detachable cylinder head is inclined from the horizontal to afford a better shape of combustion chamber than would otherwise be feasible. Water is circulated by thermosyphon and a gilled vertical tube radiator with aluminum top and bottom tanks is used, secured rigidly by studs and nuts to the front cross member of the frame.

Trough lubrication is adopted, the gear type pump being at the front end of the camshaft, forward of the distribution casing, and is formed as a unit with a large and accessible strainer. Three plain journal bearings support the crankshaft, the distribution gearing at the front consisting of straight toothed pinions.

To the back of the crankcase is bolted the aluminum bell housing open at the top and enclosing flywheel and dry single plate clutch, the transmission casing being bolted up to it at the rear. Three speeds are provided, with a central lever working in a ball socket. An open propeller shaft is used with a star joint at the front enclosed within a rear extension of the transmission casing; at the rear is a sliding block joint.

Final drive is by top worm gearing, carried as a unit

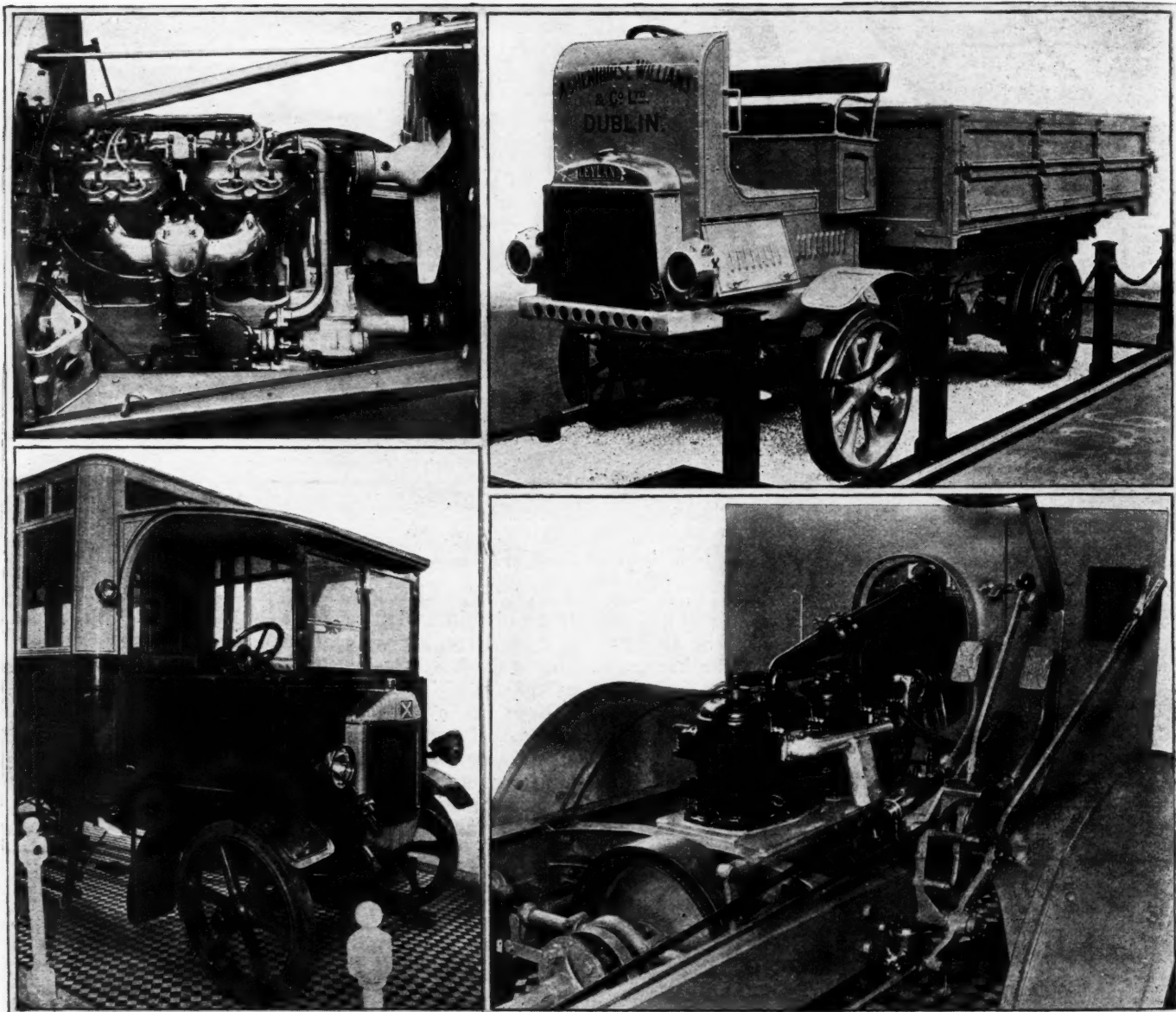
in an aluminum top cover of the axle casing. The latter is a steel forging with integral sump and has the spring and brake brackets keyed and shrunk on to the integral extensions which carry the wheels on floating bushes.

Both brake lever and pedal operate shoes within the rear wheel drums, the latter measuring  $18 \times 2\frac{1}{2}$  in. Each shoe forms a segment of approximately 90 deg. and pedal and lever apply alternate shoes.

Either pneumatic or solid tires are furnished, the former at an extra charge of £20; with pneumatics, disk wheels are used; with solids, the hollow cast spoked variety. Steering is by worm and wheel, with magneto ignition control over the hand wheel; the throttle is controlled by pedal only.

The frame is of pressed channel steel, both side members being straight throughout. Springs are half-elliptic and an oil cup system of lubrication is used for the spring pins and other chassis details. Following are some leading particulars: Weight of chassis, 3800 lb.; overall length, 14 ft.; wheelbase, 112 in.; track, 56 in.; dashboard to end of frame, 141 in.; height of top of frame from ground,  $28\frac{1}{2}$  in.; gross load capacity, 4000 lb.; direct gear ratio, 6 to 1.

In general this is a good production job, though exception must be made in regard to the valve operation and cylinder head arrangement. These provide selling points no doubt—viz., greater efficiency and accessibility—but whether the additional cost as compared with the normal L head is justified is doubtful. So far as the substitution of rockers for vertical tappets is concerned, there is not much amiss with this from a production standpoint; where the design falls short in the latter respect is in departing from the horizontal and vertical in regard to various machining operations. The top facing of the cylinder block, for example, is set at one angle, the valve guides and seats are at another, while there are, of course, also the vertical cylinder bores and the base flange at right angles to them. These variations from normal can hardly make for a minimum of cost, though taken by themselves they need not, admittedly, account for very much difference; and apparently the makers consider they justify themselves when they are handed on to the sales department. The detachable head cylinders separate from the top half of the crankcase may also fail to secure approval from the production expert.



(Upper left)—T head engine of new Dennis chassis. Note peculiar circuit of water from pump. (Upper right)—Leyland 3 ton full overtyp truck with 102 in. wheelbase. Has 64 in. track at front and 52 in. at rear. (Lower left)—Front end of Caledon semi overtyp truck chassis with singledeck bus body. (Lower right)—Single sleeve engine of Caledon truck for 15,000 lb. loads. Driver's position is alongside engine

The Dennis truck is one of the oldest among British commercial cars and was the first to adopt worm drive, some eighteen years ago. A 2-ton model was introduced at the 1920 Olympia Truck Show, and this year a new 4-tonner (9000 lb. load) has appeared. While it is suitable for goods carrying bodies, it is primarily intended for omnibus and motor coach work, for with a length of 20 ft. 3 in. from dash to rear end of frame and 15 ft. 4 in. wheelbase, it will take a 56-seated double-deck bus body, or a 36-passenger single-decker. This, however, necessitates an overhang behind the rear axle of 90 in., for no attempt has been made to adopt the forward position for the driver. It is also offered for the carrying of bulky goods.

The pressed steel frame has channels 8 in. deep between the springs and 6 in. at the ends. There are five pressed steel cross members. A long sub-frame for engine and separate gearset is suspended at three points, from a central longitudinal trunnion at the front and by two brackets depending from a main frame and cross-member behind the gearset. The engine rests at four points on this sub-frame, while the gearset is hung below it by two bolts at each of its four corners.

In this new model Dennis retains the pair-cast T head engine design, with integral head  $4\frac{7}{8} \times 5\frac{7}{8}$  in. cylinder on a two-part aluminum crankcase. The crankshaft has three bearings and the connecting rod big-ends have four bolts each. Lubrication is on the trough and pressure system and ignition is by magneto. The pump water circulation is unusually arranged; from the pump on the right of the crankcase the water is delivered to near the top of the front pair of cylinders; passing through the latter it runs back through a coupling pipe to the rear pair, then out at the back and by a single rising pipe to the top of the radiator. This arrangement can hardly be conducive to equal cooling of all the cylinders.

A cone clutch and coupling shaft with two flexible disk joints carry the drive to the four-speed gearset. The latter has a one-piece aluminum box-like casing with an over-all cover plate. All shafts have ball bearings, the main shaft being splined. A shoe type transmission brake is located behind the gearset and a solid coupling shaft 42 in. long  $\times 1\frac{1}{4}$  in. diameter leads to the star universal at the head of the propeller shaft. The latter is enclosed in a torque tube of 5 in. diameter with flanged ends, the



whole machined from the solid bar; the front flange is bolted to a hollow spherical end which encloses the star universal joint and is supported by a cast steel cross-member, itself carried in rubber bushed trunnion brackets on the main frame—the rubber bushes or rings being obviously intended to take up the peak of transmission shocks. Dennis, by the way, has always made a feature of some flexible element in the transmission system and at one time used a spring coupling behind the gearset.

The top worm with worm wheel and differential is carried as a unit in the top cover of the cast axle casing; the latter has the sump integral, but has flanged and bolted-on extensions carrying the spring and brake brackets and the floating bushes of the wheel bearings. The wheel brakes are of the internal shoe type, with drums of 22 in. diameter and 3 in. wide.

This new Dennis chassis is unquestionably a sturdy job; it weighs slightly over 7000 lb. with solid tired, cast, hollow-spoked wheels, and is typical of the now medium but formerly heavy type of British truck. Its selling price is now £950, which represents a drop of £330 since its introduction.

One of the biggest of British truck makers and with a range of models already approaching a dozen—counting variations made available in five main types—Leyland has now put forward another model, a 3-tonner. This has a wheel-base of only 102 in. and an overall length of 192 in. It is of the full over-type, i.e., has the driver's seat and platform on top of the engine space, with a weather board in front. There has been a limited demand in England for a truck with a small turning circle and capable of being weighed both axles at once on any public weigh-bridge; and this new Leyland is put out to meet that demand. As with all over-type trucks, accessibility is sacrificed to a certain extent to obtain the advantages of the general arrangement.

The driver's platform is supported by an angle steel frame, forming the engine hood with detachable floor-boards above and sheet steel sides, hinged as to approximately half their length. This frame carries the pedal shaft and, on the right, the gear shift and brake levers, but the steering column is continued through to the front right-hand corner of the main frame.

The four-cylinder  $4\frac{1}{2} \times 5$  in. engine is supported back and front by lateral tubes, passing through the upper half of the aluminum crankcase. The separate gearset is also supported by two tubular cross members at four points. Behind the gearset it is clear that this is not a model specially designed throughout, for one finds an open coupling shaft leading to a very short propeller shaft, the latter enclosed in a spherical headed torque tube supported by a bracket housing projecting rearwardly from a 3-in. diameter tubular cross-member of the frame. If the transmission had been specially designed, it is unlikely that a two-part propeller shaft would have been adopted, in view of the short wheelbase.

Final drive is by top worm, with a differential carrier forming the top section of the cast steel center of the axle casing. A departure from normal is seen in the semi-

elliptic rear spring mountings; each eye of the spring is secured to a slide block free to move fore and aft on frame brackets with horizontal surfaces which are shaped to a V at each side to dovetail into the slide blocks. The sliding surfaces are exposed, grease cup lubrication being provided. This chassis has different wheel tracks fore and aft; at the front the tire centers are 64 in. apart and at the back only 52 in. The chassis price is £1,000.

Commer has a new 6-ton model, but in the main it is merely an enlarged and strengthened edition of the 4-ton type, with a larger engine. The latter has a bore and stroke of 120 x 140 mm. ( $4\frac{3}{4} \times 5\frac{1}{2}$ ), pair cast L head cylinders, ball bearing crankshaft, thermo-syphon water circulation; all three items being standard Commer practice. The engine is three-point suspended on the main frame; there is a single longitudinal trunnion support in the cast front cross member, while the back end of the crankcase has a cast channel section two-armed bracket bolted to it and extending to the side frame members.

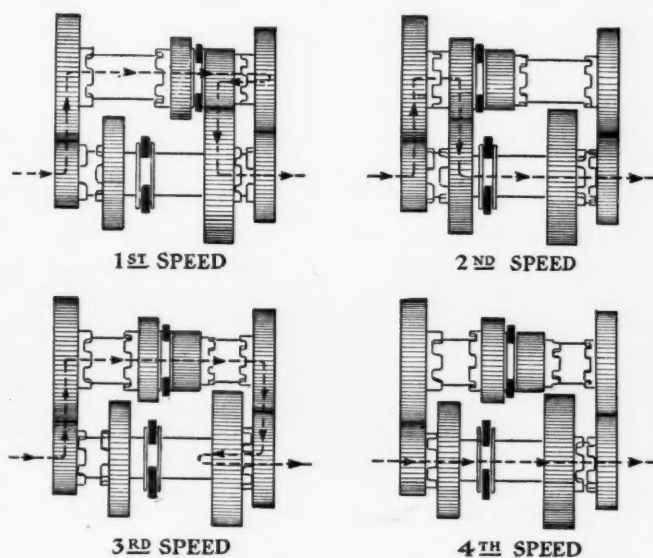
The induction tract is also unusual, for from the carburetor on the right to the valves on the left the mixture passes through a branched manifold to passages across the cylinder blocks below the water jackets and up to the valve ports.

Channel steel pressings form the frame side members, these being  $6\frac{1}{2}$  in. deep by  $2\frac{1}{4}$  in. wide between the spring hangers and tapering to  $4\frac{5}{8}$  in. deep at the ends; but a  $15/16$  in. adjustable truss rod is used under each side, anchored at the front to the rear spring bracket and at the rear to a special frame bracket some 12 in. behind the rear axle; there are two

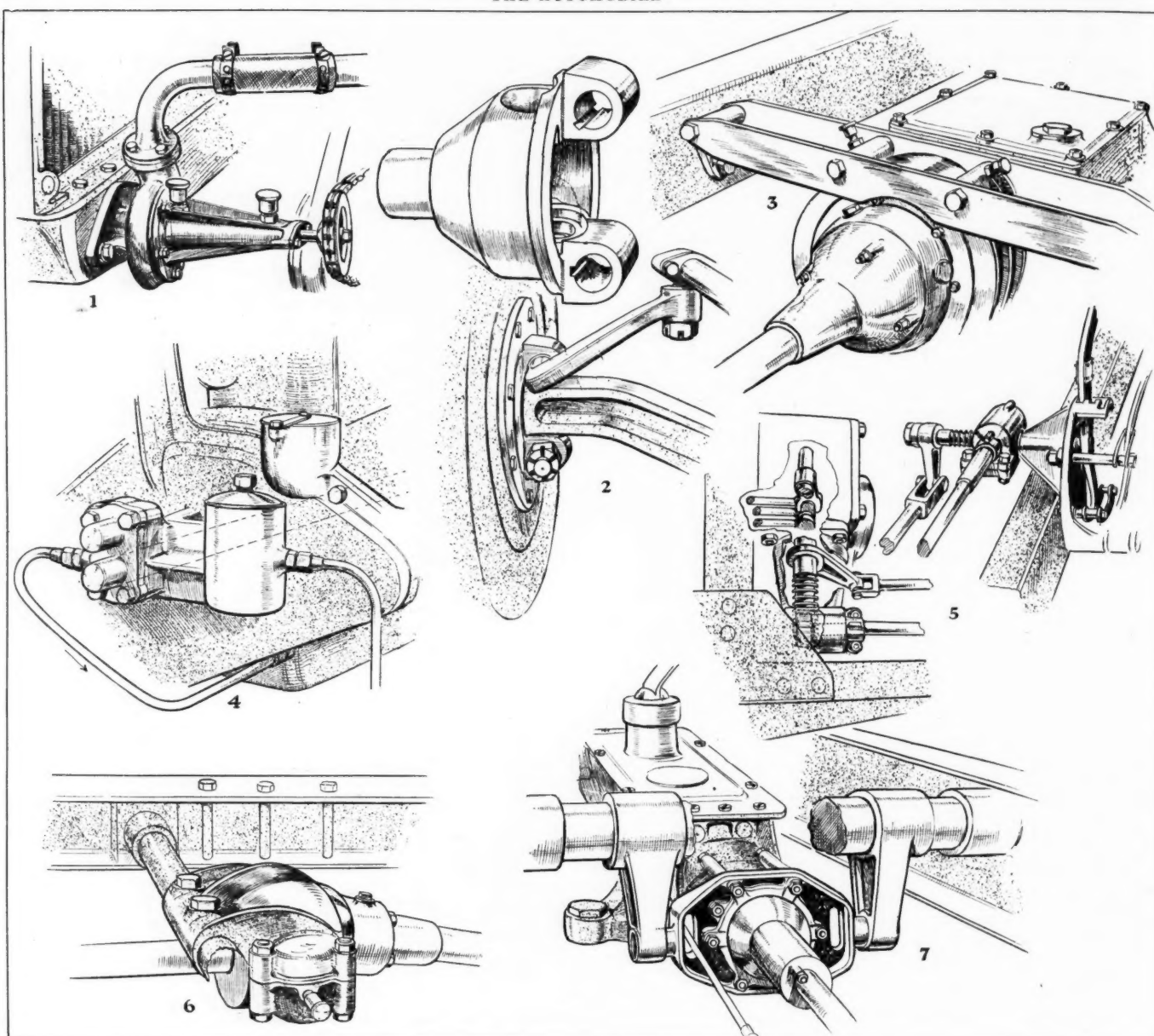
struts, that at the rear being in line with the front hanger of the back spring. Transmission is by cone clutch, four-speed separately mounted gearset, and side chains. Commer's are made in six models, three having worm drive and three side chains.

An outstanding feature of Commer trucks has always been a type of gearset different from the normal sliding and selective system. Until lately the Lindley gearset has been used, in which the gears are constantly in mesh and brought into use by a rotating grooved cam which allowed spring-backed dog clutches to be engaged. But the Lindley set has been dropped and another special pattern is now standardized. This is of the selective type, giving four speeds. There are constant mesh wheels at each end of the box, and two sliding sleeves, each with two pinions and dog teeth at their ends; one sliding member is on the layshaft and is free to rotate thereon, the other moving endwise only on the splined main shaft. The various combinations are shown by the diagrammatic views herewith.

When the ratio is varied, the gear teeth are engaged when the gear on the layshaft is rotating idly and only its own inertia has to be overcome to vary its peripheral speed; not until its teeth had become two-thirds engaged are the dogs brought together. The dog teeth are stepped, beveled off and slightly undercut, and the arrangement is claimed to effect a great improvement in ease of gear shifting, both up and down; the gear teeth are not dam-



Gear positions of new Commer transmissions



1—Belt driven water pump of 6,500 lb. Maudslay secured to bottom tank of radiator. 2—Central pivot steering of Maudslay 13,000 lb. truck. Upper view shows swivel axle design. 3—Method of supporting transmission brake shoes on Maudslay truck direct from side frame members. 4—Combined gear type oil pump and strainer at front end of camshaft of new Guy engine. 5—Caledon gear shift couplings. Circular racks operated by pinions on transverse shafts provide lateral movement for striking rod. 6—The bracket overhung from a tubular cross member to support the forward end of the Leyland torque tube. 7—Method of suspending rear end of engine and gearset unit on new 2,750 lb. Guy

aged if the driver is careless or incompetent and the dogs will stand up to rough treatment. To shorten the shafts, by having the gear wheels closer together, both sliding sleeves are moved when the third and top ratios are being engaged; this is simply arranged by having two striking arms on the lever shaft, one only engaging a selector rod for first and second speeds, but both being in use for either of the two higher ratios. This gearset is obviously somewhat more costly to make than the usual pattern, but for heavy trucks the slight extra cost may be justified.

Both the new 7-ton and the 4-ton Caledon models, the latter used mainly for bus work, are of the semi-over type, and are designed on the same general lines except that the lighter chassis has top worm drive as against the other's double chains. The engine on the big chassis is three-point suspended in the main frame by means of a trunnion bearing at the front and a cast steel cross member bolted to the crankcase at the rear.

As on the over-type Maudslay, the steering box is bolted to the front right-hand corner of the rolled steel

frame, the latter being 7 in. deep and 3 in. wide, straight from end to end. Engine accessibility is partially sacrificed to obtain the lengthy load space, the magneto, for example, being under the driver's footboard and needing a contortionist to inspect the contact breaker without removing the whole machine.

The four-speed gearset is amidships, three-point suspended from pressed steel cross members. The gear shift coupling between lever shaft and selector rods is novel; it should prevent jamming and binding, but is an expensive design, and hardly worth while when the same ends can be secured in a less costly manner. The lever shaft, which is 60 in. or so in front of the gearset, has a series of grooves or circular teeth near its inner end, which, when the lever is pushed across the "gate," rotate a pinion on a longitudinal jointed shaft having a similar pinion at its rear end, this second pinion serving to move another rack or grooved shaft which carries the selector finger or lever. Thus lateral movement of the gear shift lever is conveyed to the selector finger; the extreme inner end of



the shaft of the former carries a short drop lever, with a coupling rod to a corresponding lever on the selector shaft; this means enabling the gear sleeves to be moved as usual.

This chassis provides an 18 ft. (216 in.) loading platform with 6 ft. (72 in.) overhang at the rear.

The manufacturer of the Star has hitherto made three types of chassis all identical as to engine and gearset but varying in respect of weight and strength of frame, springs and axles. But the heaviest of these (3 ton) has been dropped and its place taken by a 4-tonner. The new type has a four-cylinder pair-cast detachable L head engine. Besides being peculiar in having detachable heads on pair-cast cylinders, it is notable in having the cylinder holding-down studs extended so that they serve also to secure the cylinder head along the right-hand side and center; on the left is the usual row of short studs and nuts. Threaded valve caps are provided in the head. With a bore and stroke of 127 x 140 mm. (5 x 5½ in.), this engine has a separate two-part aluminum crankcase with handholes on the right large enough to enable the piston and connecting rods to be withdrawn or fitted without displacing the sump. Helical gear distribution is

used with a transverse shaft driving magneto and water pump. Hollow shaft lubrication, cone clutch, four-speed gearset amidships (three-point suspended on a subframe), double reduction final drive, transmission brake on bevel pinion shaft, and internal brakes on rear wheels are other details of the design.

A two-part propeller shaft is used. Drive and torque are taken by triangulated pressed steel members leading from each side of the central casing of the axle to a spherical mounting below a pressed steel cross member of the frame. The price of this chassis is £960.

The name Sheffield Simplex has long been associated with private passenger cars, and at the October Show it was attached for the first time to a truck chassis. The latter is to be called the Sheffield and is intended for 1½-ton loads. It follows quite normal lines throughout, with pair-cast L head cylinders, 4 x 4¾ in. bore and stroke, thermo-syphon circulation, trough lubrication, magneto ignition, cone clutch, amidships three-speed gearset and Hotchkiss drive; but for the reputation of its makers for high-class work it would be hardly worthy of mention, so ordinary is it in general design and layout. The chassis is offered at £680.

## The Common Sense Cost Accounting System

THE fact that many cost accounting systems have been worked out on a highly theoretical, but impractical basis was brought out in a paper read before the conference of the Industrial Cost Association, held in Pittsburgh recently, by J. M. Howell of the General Electric Company, Schenectady, N. Y. Many of these systems, Mr. Howell said, have broken down when confronted with the cold facts of business.

The paper went on to point out that industry has reached a point where it is no longer sufficient that a satisfactory cost system merely record expenditures already incurred, but it must also provide a medium for a positive control of these expenditures. Many cost investigations at present are but post-mortems over some important contract which, after completion, has shown an unexpected loss instead of the expected profit.

Cost reports, to be of real value to executives, must be rendered promptly. This is especially true at the present time with those which cover indirect or overhead charges. In general these reports in the past have gone into too much unnecessary detail and in most instances the essential facts could be shown in simpler and better form. In many cases the use of graphic charts would present the information in a more striking and convincing manner than the old methods.

The executive will find the report of little value, no matter how accurate and complete it may be, unless the records are maintained in such a way as to be readily available for compiling prompt estimates for quoting on new business. Nothing can more quickly demoralize a business organization than failure to accurately forecast the cost of production. Furthermore, the system cannot be considered as ideal unless provision is made for furnishing designers, superintendents or foremen with correct detailed information concerning relative costs of various materials, operations and processes.

The effective cost system will also provide for the immediate detection and segregation of any unusual expenditures, either in direct costs or overhead, in order that these may be considered separately in establishing selling prices. This is especially important in the manufacture of a standardized product. A ready-made cost system is seldom a good fit. The now somewhat obso-

lete method of applying a flat percentage rate to cover overhead, undoubtedly has its serious faults, but the other extreme of trying to determine the exact rate of overhead for each machine or tool in a factory also has its disadvantages and may be carried to a point where it is neither desirable nor practical. Most items of overhead cannot be definitely allocated, and must, therefore, be pro-rated on a common sense basis.

There are some cost systems, too, which require so much of the workman's time in keeping his accounts, that his productive capacity is decreased. No cost system should require much clerical work on the part of workmen, such as making out time cards, etc., but better results can usually be obtained by having regularly appointed clerks handle, as far as possible, all such work.

The properly balanced cost system must fit into other departments of the business organization. It must co-operate with the selling system in order to promptly and accurately forecast the cost of future production. The purchasing division must keep a steady stream of information flowing into the cost department concerning prices of commodities. The production, or shop routine, division, the designing engineers and the shop superintendents and foremen must all work with the cost accounting division. Failing in this functioning to the fullest extent in its relation to other departments the cost system is pretty apt to have a demoralizing effect.

In brief, the efficient cost system, to achieve the maximum of success, must be based on the fundamental principles of sound accounting procedure and good business practice. In respect to details it should be constructed along the lines of common sense and straight thinking as they apply to the particular business under consideration. This method will prove far more useful to the manufacturer than one in the use of which he allows himself to be guided by ready-made rules and forms.

A BOOK in which an effort has been made to list the number and size of piston rings used in every make and model of passenger car, truck, tractor, marine engine and stationary gas engine manufactured in this country has recently been published by the Gill Manufacturing Co.

# Automatic Brake Regulation to Prevent Wheel Locking

In one brake here described the braking action is dependent upon centrifugal force, which increases as the car speed increases and vice versa. French designers have recently been giving much attention to the servo brake which is applied by other than direct muscular pressure.

IN a previous issue of AUTOMOTIVE INDUSTRIES the statement was made that one of the features of this year's Paris show was the attention which had been paid by French and other Continental designers to the problem of effective braking. This was emphasized, for one thing, by the large number of firms which had adopted front wheel brakes or used four-wheel braking. There was, however, also another development in this line, namely, the adoption of brakes which automatically prevent the locking of the wheels, thus enabling the maximum retarding effect to be obtained and at the same time preventing injury to the tires.

A brake of this type, known as the Hallot brake, was exhibited on the Chenard-Walcker car at the Paris show, and has also been fitted to many other makes. They have been described by *La Vie Automobile*. The principle underlying the design of this brake is as follows: The brake consists of the usual drum and expanding or contracting member, but the drum, instead of being rigidly keyed to the wheel hub, is free to turn thereon. In addition to the above-mentioned parts the brake comprises a disk or spider which is fast upon the shaft to be retarded and takes the place of the web or spider of the ordinary brake drum. The rim of this disk is formed with recesses in which there are located centrifugal weights. These weights are lightly pressed against the inside of the brake drum by coiled springs

within them, and when the wheel is rotating they are pressed against the drum by the additional force of centrifugal action. The radial pressure due to the centrifugal force varies as the square of the speed of the car and is therefore very great at high speeds and very small at low speeds.

Now suppose that the car is proceeding at high speed and that the brake is applied. At first the brake band or sectors will slip on the drum, because the centrifugal weights now rotating at very high speed are applied with great force to the drum and hold it fast on the wheel hub. But as the speed of the vehicle decreases a point is reached where the friction between the brake band and the drum exceeds that between the centrifugal weights and the drum, and slippage will then occur between the latter parts.

## Wheel Locking Impossible

It will be readily seen that with this construction it is entirely impossible to lock the wheels, because as the wheels approach a standstill the centrifugal force on the weights becomes almost zero and the retarding effort practically vanishes. By properly proportioning the parts of the brake it is possible to limit the force of application to just a little less than required to cause locking and thus obtain the maximum retarding effect.

It is, of course, also necessary to be able to apply a

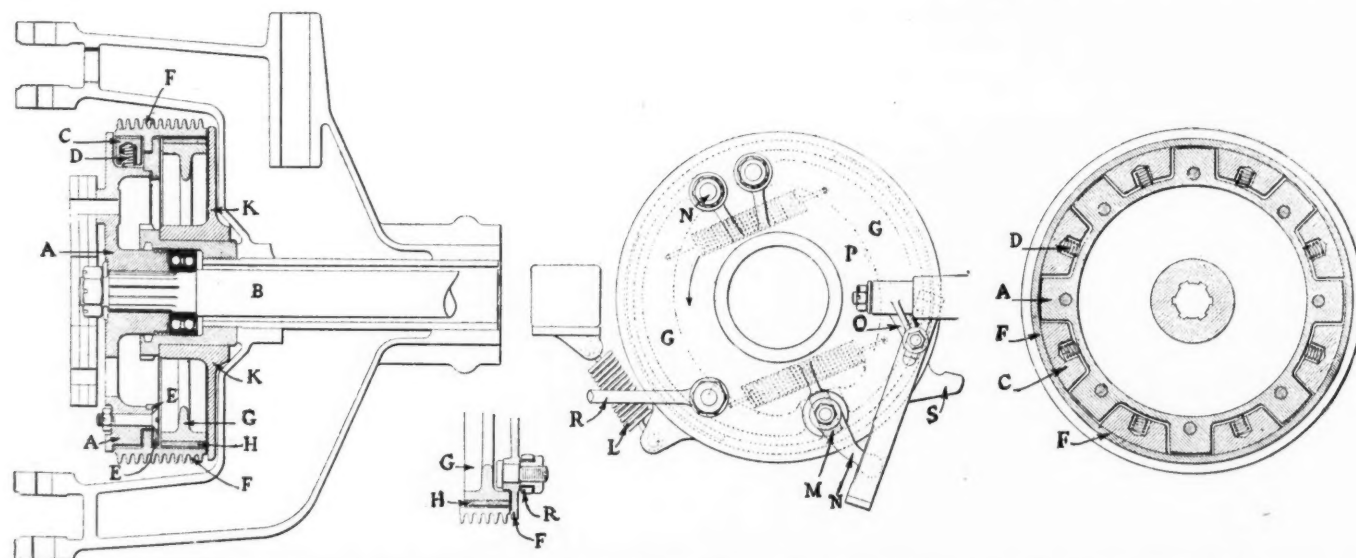


Fig. 1—Hallot automatic regulating servo brake as fitted to Bignan-Sport car. A, driving disk with recesses for the centrifugal weights; B, propeller shaft; C, centrifugal weights; D, spring applying centrifugal weight to floating drum with constant force; E, centering flange; F, floating drum; G, brake sectors; H, asbestos-fabric lining; K, disk supporting brake-operating mechanism; L, return spring; M, brake cam; N, brake arm; O, ball stud lever connected to brake pedal; P, hub of operating device for front wheel brakes; R, pull rod for front wheel brake; S, stop limiting motion of hub



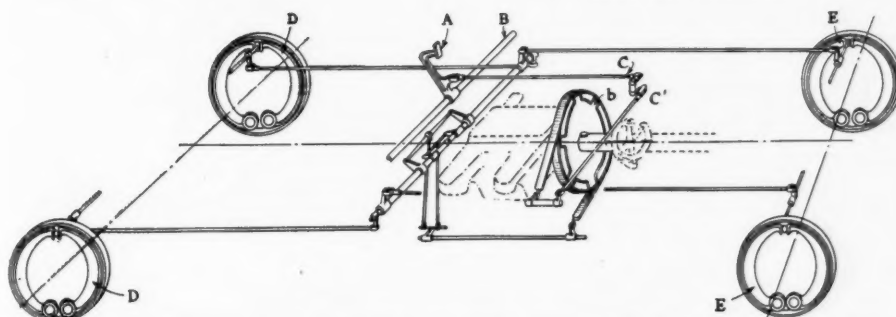


Fig. 2—Diagram of servo-regulating operating mechanism for four-wheel brakes. A, pedal; B, pedal shaft; C, C', operating links of the servo brake band b; D, front wheel brakes; E, rear wheel brakes

retarding effect while the car is proceeding at low speed, as well as to be able to hold the car in position on a grade, and this is accomplished in the Hallot by providing a supplementary brake designed on the lines of the ordinary brake, but far from being sufficiently powerful to lock the wheels. At high speeds the braking power of the automatically regulated brake predominates, while at low speeds the auxiliary brake is the most powerful, and at all speeds the effects of the two brakes are cumulative.

### The Servo Brake

French designers during the past two years have also given some attention to what is known as the servo brake, by which is meant a brake which is applied by other than direct muscular power. Such a brake may be laid out in the following way: Consider a brake drum mounted on the propeller shaft; say, directly behind the transmission. A brake band may surround this drum, one end being connected to the operating member of the brake (lever or pedal), and the other to the rod which connects to the rear wheel brakes. If a pressure is exerted through the operating member of one end of the band, owing to the friction between the band and the drum, a much greater tension is exerted by the other end of the band on the brake rod, and this device therefore serves as a multiplying mechanism. The multiplying ratio can be made anything desired by varying the arc of contact between the band and drum. It is an easy matter to convert an ordinary servo brake into an automatically regulating servo brake. All that is necessary is to replace the keyed brake drum by a free-running pulley containing centrifugal weights on the inside, like the Hallot brake described above. In that case the multiplication of the force of brake application is automatically limited by the friction of the centrifugal weights against the drum and this friction automatically decreases with the speed of the vehicle.

Of course, the automatically regulated servo brake is supplemented by an ordinary brake. On the other hand, it may be so arranged as to act as a brake itself. That is, instead of serving merely as a multiplying agent for the force with which the brake is applied, it, in itself, may be used to exert a retarding action on the vehicle. This arrangement is made use of on the Bignan car, the brake lay-out of which is illustrated herewith.

One of the first manufacturers to use the Hallot brake in regular production was Chenard-Walcker, and the engineers of this firm are said to have achieved almost unbelievable results, stopping the car from a speed of 100 km. (62 m.p.h.) in a distance of 93.5 ft. without slipping of any of the wheels and without the least skid, the road conditions being specially favorable.

The advantages of the Hallot brake are illustrated by the curves shown herewith. At a speed of 50 m.p.h.

a vehicle fitted with ordinary brakes comes to a stop in 334 ft. Under the same conditions a car fitted with Hallot brakes stops in 195 ft. If the two full line curves are compared, it will be seen that the vehicle equipped with Hallot brakes lose speed much more rapidly. At the point where this vehicle comes to a stop, the other, with ordinary brakes, still has a speed of over 30 m.p.h.

All those familiar with the operation of high speed vehicles know that during the first few moments of brake application the reduction in

speed is hardly noticeable. Referring to the two curves (Fig. 3) of braking effort, for the ordinary brake it has a very low value to begin with, but increases little by little, becoming very large as the vehicle comes to a stop, when it is of no use. With the Hallot brake, on the other hand, there is a very considerable braking force right from the beginning, and it increases rapidly, tending to equal the adherence of the wheels to the ground. When this point is approached, and locking of the wheels

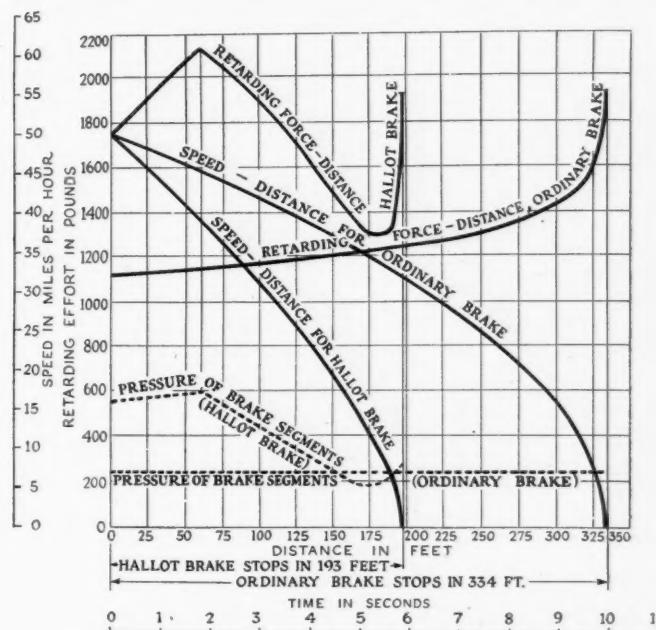


Fig. 3—Curves of braking effect with ordinary and Hallot servo brakes applied to the rear wheels only

is about to occur, the braking effort is automatically reduced. This strong initial braking effort obtained with the Hallot brake results in reducing the speed of the car from 50 to 22.5 m.p.h. in a distance of 131 ft., while the other car is still running at 37.5 m.p.h.

### Judges Appointed for Essay Contest

THE following men have been appointed judges to award the four-year university scholarship offered by Harvey Firestone for the best essay written on the subject "Good Roads and Highway Transport": Dean A. N. Johnson, Department of Engineering, University of Maryland; Harford Powel, Jr., editor of "Collier's Weekly," and C. H. Huston, Assistant Secretary of the Department of Commerce and president of the Lee Highway Association. The contest is open to all high school pupils in the country and is being conducted under the auspices of the Highway and Highway Transport Education Committee.

# Design Problems of the Isolated Electric Plant

Present difficulty is low efficiency energy transformations before usable power is obtained. Battery cost represents about 50 per cent of the initial output in 32 volt plant and also figures high in operating cost. Ultimate type of electric plant will be the full automatic, the author believes.

By Gustave Wiedeman

THE difficulty which hinders the more extensive use of isolated electric plants, particularly for power purposes, is the larger number of low-efficiency energy transformations necessitated before usable power is obtained. For instance, the energy in gasoline or kerosene is transferred from a chemical to a mechanical form at approximately 15 per cent efficiency. This step is fundamentally necessary and cannot be practically eliminated or improved at present. Next, the mechanical energy of the engine shaft must be changed into electrical form by means of the generator, which is done at about 60 per cent efficiency. The transference of the electric current into storage battery energy requires a loss of 25 per cent. If now the current is used in an electric motor, 60 per cent to 70 per cent is the ordinary efficiency of the transformation. Thus it is evident that the over-all efficiency of the electric battery plant is very low and therefore extensive electric motor power use raises the cost of plant maintenance to a prohibitive figure. If power from a pulley of the electric plant can be utilized, the saving over the use of the same power from an individual electric motor drive amounts to approximately 73 per cent by reason of a 40 per cent generator loss, 25 per cent battery loss and further 40 per cent electric motor loss. In other words, it requires practically a 4 hp. plant engine to produce the power consumed by a 1 hp. electric motor, if run by the battery. Only 25 per cent of the plants made at present have engines as large as a 4 hp.

## Power Pulley for Power Purposes

The question naturally arises in this connection, "Why not use the power pulley exclusively for power purposes and dispense with all power-wasting individual electric motors?" In addition to the stock arguments advanced against it, such as immobility, belt troubles, etc., it is interesting to note that the actual power delivered at the pulley bears a widely varying ratio in the different models to the maximum power attainable through electric motor drives. The average excess engine power over generator output averages 60 per cent for plants designed for belt work and 35 per cent for plants not provided with power pulleys. In some cases the engine rated output exceeds the generator output by only 10 per cent, whereas the maximum excess is as high as 160 per cent, allowing in this estimate a 40 per cent generator loss. The engine output generally decreases materially as the engine becomes carbonized, the valves need adjustment, etc., and under such circumstances an engine will fail to rotate the generator under full load if the excess power ratio is as low as the figure stated above. We may be justified in concluding, therefore, that the power possibilities of a

plant can be most advantageously developed by using belt power in plants of high excess power ratio and confining light power work through electric motors to plants of low excess power ratio, where little is gained by having a power pulley. This latter condition holds particularly for full-automatic systems which are provided with an automatic generator cut-in, thus obtaining through electric motor drives for limited periods a discharge rate in excess of the normal generator output.

In designing an electric plant primarily for power use, it is evident that we face a problem essentially different from that met with in lighting plants. The power work with present plants is clearly limited by the great losses involved in the energy transformations necessary and very obviously the development of real power plants is interconnected with the evolution of some form of system which can eliminate the greater part of these losses.

## Battery Cost High

Finally, the power aspect of isolated electric plants presents a rather discouraging outlook from the battery standpoint. The battery cost of the average 32 volt plant now amounts to about 50 per cent of the total initial plant cost. Not only is the battery the element of the plant which requires the most frequent renewals but it also represents a large share of the plant cost. At present the average capacity of the battery at the generator rated capacity is about 5 hours, as stated above. If 5 hours of lighting and 5 hours of power work are averaged at normal generator capacity per week, it means 104 chargings per year, and, based on a battery life of 400 cycles, evidently such an installation would require a battery renewal in less than 4 years. At \$200 to \$300 per set of batteries, the cost per year for the battery alone aggregates \$50 to \$60, which just about equals the normal annual fuel costs. Thus it is evident that the power capacity of electric plants is limited by the capacity of its battery and since this is the big maintenance item, it is natural that electric plant engineers of the future should study this weakness of current design.

The electric plant industry is still in its infancy, a statement verified by the fact that about one-half of all plants produced have been made and sold within the last two years. This being the case, we cannot reasonably expect stability of plant design for some time to come. Even ten years of automobile development failed to settle such controversial questions as number of cylinders, two or four cycle, air or water cooled, chain or gear drive, etc. Similar issues are confronting the isolated electric plant industry, and a few of these are worthy of discussion from a commercially unprejudiced standpoint.



The most important of these is the matter of system voltage. On account of the ease and economy in securing lamps and other equipment, the 110 volt system would naturally be preferred for the ordinary installation. If the generating plant used is semi-automatic in operation, 56 cells are required for its battery complement and usually this item alone accounts for 50 per cent of the initial plant cost. Actually about 15 per cent of domestic plants are of this class. There are a few plants obtainable employing 60 volts, and the remainder of those using batteries, operate on 32 volts. The latter constitute the majority in current production which may be accounted for principally by the fact that such a system is the easiest to build and the cheapest to put on the market. Where a considerable area is to be covered with the lighting and power system, the cost of wire is an important item and for the same power varies inversely as the voltage. The copper cost of a 110 volt system is therefore only slightly more than one-quarter that for a 32 volt unit and the advantage in point of line loss is in the same ratio. Notwithstanding this fact about 80 per cent of present plants include 32 volt battery equipment.

#### Choice of the System

Another of the important issues facing plant designers is the choice of system, whether manual, semi-automatic or full-automatic in character. Several full-automatic plant manufacturers have failed in the past, and their failure may have been influenced by imperfections in their automatic control mechanisms. At present there are four manufacturers producing full automatic plants, which employ only a low-voltage starting battery and deliver 110 volts D.C. to the circuit. About 10 per cent of all the units now on the market are full automatic but equipped with a 32, 60 or 110 volt battery. The remainder are about evenly divided between manual and semi-automatic control. The development of full-automatic systems have

made considerable headway in recent years and further exploitation in this field seems restricted only by the evolution of a simple, fool-proof full-automatic control, its desirability being self-evident.

Viewed from an impartial standpoint, it looks as though the full-automatic electric plant would be the ultimate type, irrespective of whether the voltage be 32, 60 or 110, and whether batteries are used or not.

#### Increased Efficiency by Batteryless System

Judged apart from other considerations, the modern electric plant offers an inviting opportunity for improvement in the way of over-all efficiency. Consider the efficiency of the average 32 volt battery system from fuel tank to lamp socket. The best net over-all efficiency of the average four cycle low-compression kerosene engine is about 15 per cent; that of the generator 90 per cent; the battery, 75 per cent; and the line about 90 per cent. Multiplying these together we obtain approximately 9 per cent as the efficiency of the whole system. With the engine in the operating condition we ordinarily find it, as well as the battery and generator, 5 per cent would probably be nearer the true average plant operating efficiency. It is therefore rational that future design should develop the full-automatic batteryless plant which offers an immediate opportunity for improvement in at least two vital respects contributing to better plant efficiency, namely, (1) no battery loss and (2) less line loss due to the ability to use 110 volts (or 220 volts, for that matter). If in such a system we assume again an engine efficiency of 15 per cent, generator 90 per cent, and line 95 per cent, we obtain almost 13 per cent as the over-all efficiency or almost 50 per cent improvement over the low-voltage battery unit. It is encouraging to note that a few far-sighted manufacturers have already undertaken the perfection of the batteryless electric plant which carries with it the possibility of halving future operating costs.

## Tractor Used in Place of Locomotive

**A** LIGHT locomotive for use by lumber mills, coal and ore mines and other manufacturing plants is to be manufactured here by the E. T. Beatty Machine Co. The locomotive consists of a Ford tractor with special attachments. Three of the locomotives are now in use and are declared to be giving satisfaction, furnishing ample power and being very economical as compared with other types of locomotives.

The attachments consist principally of a steel frame and a set of four driving wheels. Power from the rear wheels is transmitted to those at the front by two connecting rods.

The frame of the locomotive is constructed of 1 x 6-in.



Fordson tractor converted for use as a locomotive

solid steel and will be standardized, while wheels will be available in a number of different sizes to suit the needs of the buyers. The locomotives can be reconverted into tractors at any time by removal of the attachment and replacing the tractor wheels.

**T**HE new German Patent Office law regulating fees, which has recently come into force, provides for considerable increases of fees, but consideration has been shown to poor inventors. The fee for the notice of a patent is now 100 marks, for the registration of a trade design 60 marks, as hitherto; for the extension of the validity of registered trade designs 300 marks and for registered trade marks 200 marks.

The annual fee for a patent for the first two years is 100 marks each, and increases by 50 marks per annum until the sixth year; by 100 marks per annum from the seventh year to the eleventh year, and by 150 marks per annum from the twelfth to the fifteenth year, so that in the last year of a patent the charges will be 1,400 marks. The fee for lodging a complaint will henceforth be 100 marks and for the renewal of a trade mark 50 marks.

It is hinted that a revision one way or the other may be called for when the financial results of the new rates have had time to show the effect.

# An Analysis of Air Bleed in Carbureter Compensation

The bow-shaped economy curve which usually results from the conventional dynamometer test is believed to be ideal. A flatter curve may indicate loss of power resulting from too lean a mixture. Various arrangements of the air-bleeding orifice are discussed and their effect is noted.

By W. H. Weber\*

IN carbureter literature a good deal may be read about "compensation," and the question naturally arises, "What is compensation and why do we need it?" The latter part of the question is very easily explained. It is only necessary to drive a car equipped with a simple suction-controlled, single jet carbureter to find that the mixture becomes richer as the engine speed increases. We may adjust the mixture in any way we like, but we cannot overcome this tendency for the fuel to flow faster in proportion to the air as the suction increases. The former question is not so easily explained.

Fig. 1 illustrates the first question, the horsepower and economy curves being records of dynamometer tests under wide open throttle made with a simple suction-controlled fuel jet and fixed air carbureter. If we bleed air into the fuel nozzle above the normal level of the fuel and duplicate the test in Fig. 1 we will get an exactly similar economy curve, showing that we have in no way altered the characteristic flow of the simple suction-controlled jet. It is a fact that such an air bled jet can never be compensating. The effect is merely that of an air spray over the fuel helping atomization as the fuel is lifted out of the nozzle.

The dictionary tells us compensation is reparation, intimating that there is a condition requiring correction

which is the case in the plain tube carbureter. The distinction between air bleed and compensation is not generally understood, nor is the allowable percentage of air bleed generally known. The terms "air bleed" and

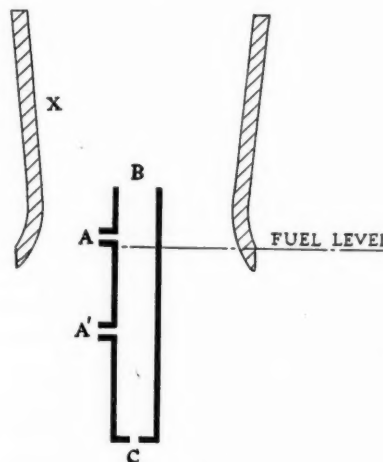


Fig. 2

compensation are synonymous only when the effect of air bleed is to alter the characteristics of the simple suction-controlled fuel jet.

It will be noted that the economy curves obtained with the simple suction-controlled fuel jet and air bled jet are of the straight line ascending type, but that the ideal economy curve is bow shaped, a little richer on both ends than in the middle. Only wide open throttle conditions are considered, because, as I indicated in my article, "Some Factors Entering Into Carbureter Construction," it is a simple matter to combine two suction controlled jets such that the suction increases on the one as it decreases on the other as the throttle is opened. This carbureter will satisfy level road, variable throttle driving, but it will fall down on hill climbing or where maximum power is desired at low engine speeds. We must accept the bow-shaped curve as ideal, for the simple reason that practical dynamometer experiments always establish such a curve. When we try to make the curve more nearly horizontal we lose power and the mixture becomes too lean to run.

This bow-shaped economy curve is obtained in plain tube carbureters by means of a compensating air bleed. To illustrate, Fig. 2 may roughly represent a discharge nozzle. The nozzle outlet B terminates at the throat of the venturi X. The calibrated fuel orifice C is submerged and the air bleed hole A above the level communicates

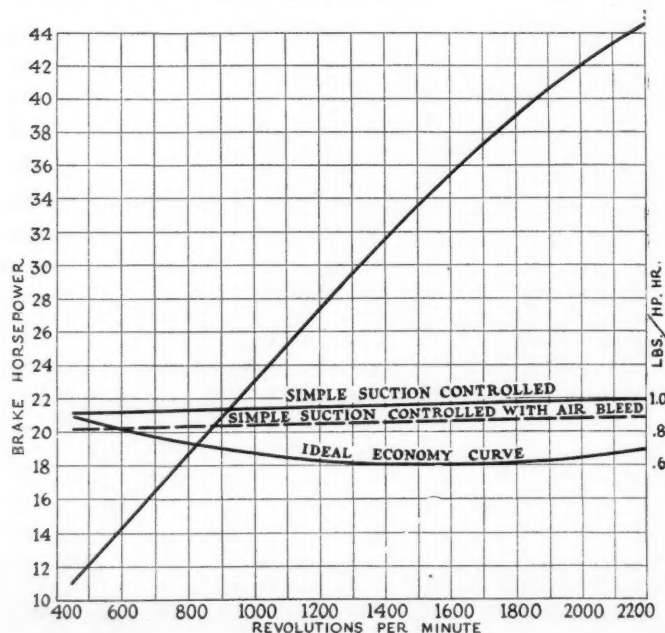


Fig. 1

\*Engineer, Claudel Carburetor Company.



directly with the atmosphere. When A is closed we get the economy curve illustrated in Fig. 1 and when it is opened we get economy curves similar in shape (ascending) regardless of the size of opening A. This is a case of pure air bleed, no compensation. Now if we move A so that the orifice pierces the nozzle below the normal fuel level we get immediately a bow-shaped economy curve, the inclination of the bow depending directly upon the distance between the fuel level and A' and the size of calibration C. We have an air bleed just as before, but we have changed the characteristic simple suction-controlled fuel jet curve. The reason is that we have introduced a second flow not dependent upon suction but constant per unit of time. This flow is due to head, since the fuel level drops in the nozzle to the position of A', and where before we had only the effect of an air bleed causing partial suction destruction, we have now the same suction on the fuel plus an additional flow by virtue of the fact that a difference in head exists between the fuel supply or float chamber and the fuel discharge or nozzle.

Fig. 3 illustrates the effect of lowering the position of A without changing its size. It will be noted that the resultant mixture is richer the lower we place A. It might be added that a much more effective method of increasing flow due to head is to increase the size of the fuel calibration C, since flow due to head varies directly only as the square root of the head, but as the square of the diameter of the orifice. It might be argued that such a change would affect the mixture throughout the range, and more especially at high speeds, when the amount of flow due to suction is so much greater than that due to head, but we have a very good method of

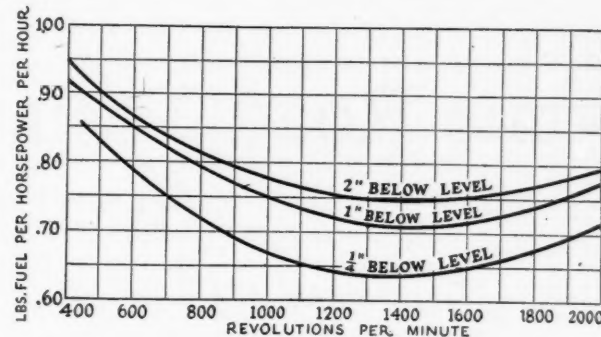


Fig. 3

offsetting the former flow by simply reducing the size of nozzle outlet B.

The plain tube carbureter is a very flexible instrument in that we may get any number of different results by juggling openings A, B and C.

A very definite and important ratio exists between outlet B and air bleed or compensating air area A, which is not generally known. In a large number of tests I varied the ratio of B/A from 0 to 1, or made the change from simple suction-controlled jet to 100 per cent air bleed, and discovered the surprising fact that when B/A is 20 per cent or less we may expect maximum power, but when we go beyond 20 per cent—that is, when the air bleed area is greater than 1/5 the nozzle outlet area—the power falls off and it is not possible to regain the power lost by increasing the size of fuel jet C. This is equally true of air bleed or compensation. In road work we may go as high as 50 per cent when extreme economy is desired, but only at a sacrifice in power.

## Municipal Transportation Improvements

THREE recommendations of importance were submitted to the American Society for Municipal Improvements by the Committee on Traffic and Transportation. The first called for the installation of motor bus routes in municipalities when an extension of the public passenger transportation system is required, the second condemned the so-called "jitney service," and the third recommended the formation of a Highway Transport Division in municipalities with a population of 100,000 or more.

Installation of motor bus routes has resulted in advantage to many cities. Such a service not only maintains the maximum practicable traffic capacity of streets, but it also avoids the use of car tracks in the highways.

From the standpoint of economic public service transportation, the installation of "jitney" service is undesirable. The systems not only overcrowd the streets, the report said, with five-passenger public transportation vehicles, but "it is obviously unfair to public service corporations, operating under franchises, to be forced to compete with a 'jitney' service which almost universally is operating on an uneconomic basis." Detroit was cited as an example of crowded streets as a result of this service.

The duties of the Highway Transport Division, as recommended by the committee, would be to deal with all matters pertaining to traffic and transportation which affect the economic design and maintenance of streets and their efficient use by pedestrians and all classes of vehicles. An important function would also be to make highway transport surveys preliminary to the design or

redesign of streets. This survey would also determine efficient methods of maintenance and the formulation of recommendations pertaining to efficient traffic regulations. Many things would have to be taken into consideration in such a survey, such as possible future developments of the community with a view to determining the sort of traffic the road would be called upon to bear. Men assigned to this work should be experienced highway engineers who have a knowledge of practically all subjects related to highway work.

## Sulphide Liquor as Dust Preventive

IN Switzerland very good results are claimed to have been obtained from the use of sulphide liquor as a dust preventive on roads. The liquor is usually distributed by means of motor-propelled sprinkling carts. After the water of the solution has evaporated there remains a brown, shiny, asphalt-like residue, consisting mainly of lignin or ligno-sulphite, which covers the road material with a hard, adhesive liquor, and in case of sufficient thickness prevents the formation of dust for weeks. The effect is the more lasting the heavier the application, and the application is the surest of results if made before any dust has formed. About 400 cu. ft. of the liquor are required per mile of road 14 ft. wide. In order to reduce the freight charges the sulphite liquor is sometimes obtained in a concentrated form and diluted at the point of use. In contrast to tar, the lignin mass is soluble in water, so that continued heavy rains may wash the coating off.

# Some Road Tests with a New Type of Accelerometer

Measurements of tractive effort, tractive resistance, braking effort and brake hp. of two trucks and two passenger cars indicate some reasons why there is a marked difference in performance of various vehicles.

By Samuel H. Woods\*

IT is generally agreed that experimental data relative to automotive equipment should be taken under conditions of road operation, so far as possible. In laboratory work so many of these conditions can be only approximated or not realized at all, that results so obtained are frequently subject to criticism on this account. Any means, therefore, of obtaining reliable data while actually operating on the road is to be welcomed as a valuable contribution to the art of automotive engineering.

An instrument by the use of which it is possible to obtain not only data on engine performance in actual road operation, but also data on tractive resistance, has been tried out by the International Motor Co. in a preliminary way and so far appears to function well. It is known as the Drewry Testometer and consists of a U-tube of uniform bore, set with its plane level when the vehicle on which it is mounted is on a level surface. One branch of the tube connects with top and one with the bottom of a closed reservoir containing a colored liquid. In manufacture, the tube is carefully set level and the reservoir filled until the liquid just reaches the center of the bend in the tube, after which the top of the reservoir is sealed, forming a closed system.

It is obvious that if the tube is now inclined endwise, the liquid will come to rest in one branch or the other of the U-tube at a distance from the end depending upon the angle of inclination. If the tube and reservoir complete, mounted in its case, be set successively at different angles, and the positions of the end of the liquid column be marked, a scale will be obtained, enabling the device to be used as an inclinometer. This, however, is distinctly a secondary use.

If we consider the instrument mounted on a vehicle weighing 10,000 lb. standing on a grade of 1 in 10 (British nomenclature), neglecting friction, the brakes hold with a retarding force of  $1/10 \times 10,000 \text{ lb.} = 1000 \text{ lb.}$ , or 224 lb. per ton (2240 lb.). It is on this basis that the instrument is calibrated, and if one analyzes the forces acting, it is not difficult to understand that this instrument will indicate at any instant the resultant accelerating or decelerating force acting on the vehicle in the direction of motion in terms of pounds per ton of its weight.

\*The author is connected with the Engineering Department of the International Motor Co., on whose behalf the tests here described were made.

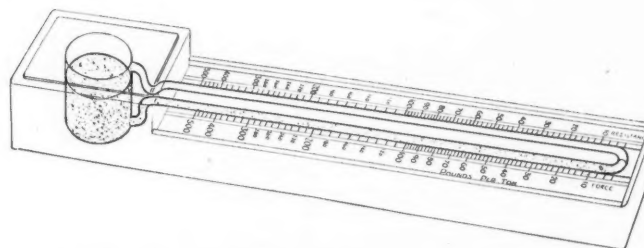
In order to understand that the instrument indicates true value of tractive resistance and tractive effort, regardless of the gradient, it is necessary only to conceive of the vehicle mentioned moving at uniform speed on the level and also on a grade. On the level the instrument will indicate zero because the engine is just overcoming tractive resistance. On the grade the indication will be the same as if standing at rest on the grade, and the engine will be overcoming tractive resistance and also raising the vehicle up the grade. When coasting down a grade the vehicle may accelerate, but we still get a true indication of tractive resistance, for the vehicle is free to move except for the retarding effect of this resistance.

The experiments were made with vehicles of widely varying weights and characteristics as shown on the charts. They consisted of—

1. Observation of tractive resistance on
  - (a) Fair granite block pavement,
  - (b) Smooth asphalt, at various speeds;
2. Observation of
  - (a) Tractive effort with full throttle opening,
  - (b) Tractive resistance,
  - (c) Tractive resistance plus engine friction, at various speeds;
3. Observation of maximum tractive effort in first, second and third speed.
4. Observation of maximum braking effort with each set of brakes.

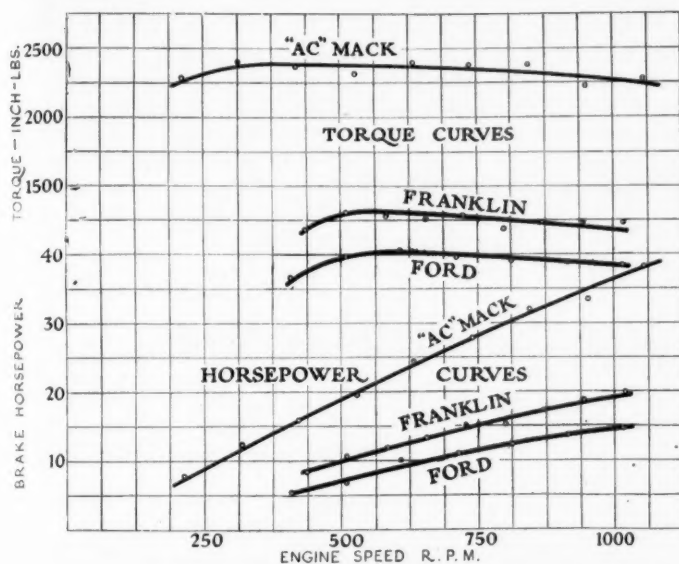
In making these observations, the procedure was, first, to level the instrument relative to the surface on which the vehicle stands. To observe tractive resistance it is necessary to select a stretch of level road of uniform character as free as possible from undulations. The vehicle is brought up to a speed 3 to 4 miles per hr. in excess of the highest speed at which it is desired to take observations. The transmission gears are then placed in neutral position and the vehicle allowed to coast. As the vehicle slows down, the testometer reading at any speed is the value of tractive resistance in pounds per ton of vehicle weight. This, of course, includes rolling friction of the tires on the road and chassis friction.

The best method of observing brake horse-power is to select an up-grade which the vehicle will not quite climb in high gear. Starting at the bottom at the maximum speed desired, observations of tractive effort which is now indicated on the instrument are taken at various speeds as the vehicle slows down. To these must be added tractive

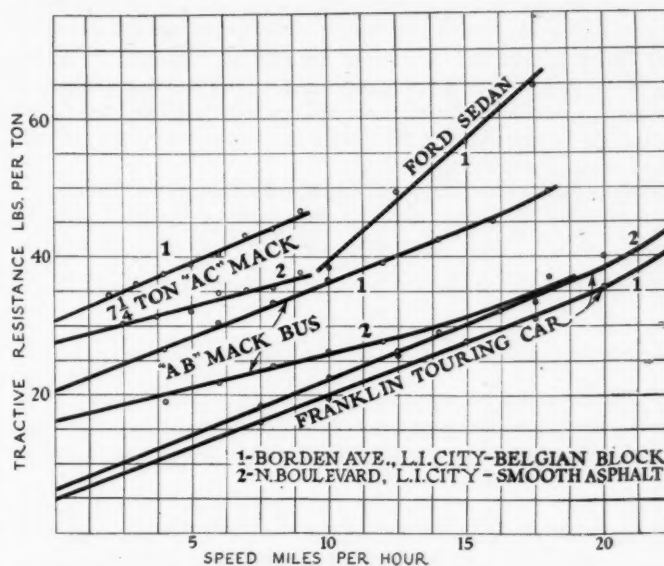


Diagrammatic view of the Drewry "Testometer," the form of accelerometer with which the tests here reported were made





Horsepower, torque and tractive resistance curves plotted from results of tests made with the Drewry "Testometer" on four different vehicles



1-BORDEN AVE., L.I. CITY-BELGIAN BLOCK  
2-N. BOULEVARD, L.I. CITY-SMOOTH ASPHALT

## PARTICULARS REGARDING VEHICLES TESTED

Vehicle	Weight as Tested, Lb.	Gear Ratio	TIRES			
			Front	Inflation Pressure, Lb. Sq. In.	Rear	Inflation Pressure, Lb. Sq. In.
7 1/2-ton Mack AC truck..	20,840	12.62	Firestone solid, 36 x 7	—	Firestone solid, 40 x 7, dual	—
Mack AB bus.....	10,260	5.88	Kelly-Springfield caterpillar (cushion), 34 x 4	—	Kelly-Springfield caterpillar (cushion), 34 x 5, dual	—
Franklin passenger car..	3,440	3.69	R-Howe cord, L-Goodrich Silvertown cord, 34 x 4 1/2	40	Kelly-Springfield cord, 34 x 4 1/2	50
Ford sedan .....	2,770	3.67	Goodyear All Weather, (fabric), 30 x 3 1/2	60	Goodyear All Weather (fabric), 30 x 3 1/2	60

resistance values obtained by allowing the car to coast down the hill and observing instrument readings at various speeds as the car accelerates. If instead of coasting with transmission in neutral, the ignition is cut off and transmission left in high gear, we obtain values which include friction, and by adding these to those of tractive effort, we obtain approximate indicated horsepower.

The values of horsepower may be obtained as follows: Let  $P_b$  = maximum tractive effort plus tractive resistance in pounds per ton at a speed in miles per hour =  $V$ , while  $W$  = vehicle weight in tons of 2240 lb. Then,

$$B.h.p. = P_b W V \times \frac{5280}{60 \times 33,000} = \frac{P_b W V}{375}$$

and, if  $P_1$  = maximum tractive effort plus tractive resistance plus engine friction, I.h.p. =  $\frac{P_1 W V}{375}$

Engine torque is obviously total engine effort =  $(P_1 W R) \div K$ , where driving wheel radius =  $R$ , and the gear ratio =  $K$ .

In all cases in which this instrument is applicable, care must be taken to use it in such a way that its indications do not change rapidly. This means that in observing values of tractive effort, the grade should be such as to permit the car to accelerate or decelerate slowly with wide open throttle. When tractive resistance is being observed, variable winds seriously affect readings on light vehicles. Unevenness in the road surface causes rapid fluctuations in the indication. If the air is still, a slight down-gradient is an advantage, but if windy so that runs must be made in both directions, a level road is preferable.

The curves attached show results obtained in the first experiments made with this instrument by the International Motor Co. To a great extent these are self-explanatory, but a few comments will aid in their interpretation. Tractive resistance will be seen to include chassis friction and rolling friction. In routine factory testing, therefore, the instrument should be of great service in

keeping the former within limits which can be established after sets of readings have been taken on a number of chassis over the same road surface. Various types of road surfaces, again, can be compared from tractive resistance indications taken upon them, using the same vehicle in each case.

It is to be noted that only one set of observations was made in obtaining the horsepower curves. By taking several sets of readings and averaging, a smoother result would be obtained and the effects of road irregularities minimized. This principle applies to all readings taken with the instrument; in order to obtain satisfactory results the average of several runs must be obtained. Great accuracy of speedometer readings is also essential.

Measurement of braking effort is a very useful function of the instrument. Taken in conjunction with tractive resistance, readings on braking effort indicate whether or not brakes drag when released, and their effectiveness when applied. Net braking effort is, of course, that indicated less the tractive resistance value at the speed at which the car is traveling. In order to be fully comprehensive, a fairly steep grade should be selected for the observation of braking effort. This in order to arrive at the values at different speeds as the car slows down, more gradually than it would on the level.

Values of maximum tractive effort, also, in order to be of greatest usefulness, must be observed under conditions which reduce the acceleration so that simultaneous readings of speed and tractive effort can be made with reasonable accuracy.

Braking effort and maximum tractive effort were observed so far as possible without undue expenditure of time, on the 7 1/2-ton truck and the Franklin touring car, with the results given below:

	Maximum Tractive Effort Lbs.-Ton			Maximum Braking Lbs.-Ton	
	1	2	3	Foot	Hand
7 1/2-ton Mack .....	380	200	140	340	215
Franklin .....	312	260	140	260	260

These values are undoubtedly low, since all except those of tractive effort with the truck were taken on a level road and the changes of indication in the instrument were too rapid to permit of great accuracy. Where an engine is governed as in the truck, the observation of low gear performance is almost impossible except on a very steep grade because of governor action.

The values of tractive resistance as shown in the curves indicate a wide difference for the various vehicles experimented with. This difference is obviously due to a com-

bination of chassis and tire friction. The exact relation of these does not yet appear. It is obvious, however, that the difference between pavements 1 and 2 is due to a difference in tire friction. It will be noted also that in the cases of the lighter vehicles a slightly more rapid rise of the curves above 15 m.p.h. is shown, indicating the effect of wind resistance. Such curves will undoubtedly be of great service in studying the effects of different types of tires and varying the elements of chassis friction through gear and bearing adjustments and lubrication.

## This Year Progressive in Federal Aid Highway Work

THE amount of money expended by the various states for highway improvement during the fiscal year ending last May 30 was nearly double the amount spent in the four previous years.

This fact is shown in figures giving the amount of the \$226,000,000 appropriated by the Federal Government for road work the states have used since the money was made available. During the four years previous to May 30, 1920, but \$40,097,881 had been taken over by the states and between that date and May 30, 1921, a total of \$38,719,134 was dealt out to the various state governments, making a total of \$78,817,015. By last midsummer the Bureau of Roads estimated that there was but about \$18,000,000 left of the original appropriation, for a vast number of projects were taken over during the summer months. Work on many hundreds of these new highways has already begun and is now being rushed. It was shown that by June 30 twelve states had completely exhausted their quotas of the money and many others had but enough remaining to permit building but a mile or two of road. Here and there were delinquents, but as a whole the states surmounted the tremendous obstacles they found in road building and co-operated with the Government in its endeavor to get improved roads built by sharing half the expense.

June of 1921 saw 1200 miles of highways (Federal aid system) completed—about twice as much as the record for May showed. The accomplishments for these two

months together nearly equaled the total completed mileage for the previous four years. The old record of 1677 miles of the 1920 May Bureau of Roads reports for finished miles had grown to 7469.

Especially rapid progress has been made in some of the Middle Western States, Indiana being an exception. By midsummer Illinois had completed 411 miles of its Federal aid roads and was spending \$12,265,218 (estimated) on 334 miles of additional roads—hard surface ones largely. Ohio, with 182 miles finished, was spending \$15,319,521 to complete 404 miles; Wisconsin had 255 miles done and had \$9,844,248 of contracts calling for 644 additional miles—a considerable quantity of this mileage of gravel, and other types. Michigan, with 105 miles of completed work, had 280 miles under construction at an estimated cost of \$8,319,920. On the same date these records of June 30, 1921, show that Indiana had finished 21 miles, and had 137 miles under way at an estimated cost of \$4,959,948. Her original apportionment was \$7,415,298, and the May 31 records show that at that time she had left to her credit, and unobligated by approved projects, \$4,545,499. She has since filed a number of projects, but not nearly enough to come within millions of her share. She may yet have a chance to obtain the money the Government set aside for her several years ago. At any rate, she has the greatest opportunity of all these of doing much work at Federal expense right now and thus relieve to some extent the unemployment situation there.

## Motor Taxation in England

A PLEA for heavier taxation of motor trucks in England was uttered recently before the Institute of Transport by E. A. Brookes, surveyor of the Durham County Council. Mr. Brookes declared the present funds available for highway maintenance were insufficient and additional revenue would have to be provided. It was pointed out that it was to the interest of the owners of these heavy vehicles that additional funds be obtained, as improved highways would result in less wear and tear upon their trucks.

Some interesting figures were brought out in the discussion, among them being statements showing that self-propelled traffic on some English roads has increased from 45.1 per cent of the whole in 1912 to 92.3 per cent in 1920, and that the traffic of heavy motors has increased from 21.6 per cent in 1912 to 51.5 per cent in 1920. It was also declared that since 1912 the total traffic in weight has increased by about 290 per cent.

Mr. Brookes, in his argument, said the present fee of 39 pounds per year was inadequate and said vehicles should be taxed one penny per ton mile.

An interesting point was brought into the discussion, however, when it was declared that the term "road user"

was given too narrow a meaning, being applied only to the owner of the vehicles using the roads. The persons to whom, or from whom the goods were being delivered, it was pointed out, also fall in the category of road users, for they benefit by the motor truck delivery. Roads also increase the value of land facing the highways and the general taxpayers should be made to bear a part of the burden for their upkeep.

Apparently the situation in England somewhat reflects the situation in this country. If registration fees are increased it can but mean that the consumer must ultimately pay the difference. These fees, in many states, are the sole funds available, other than the federal appropriations, for road improvement, whereas as a matter of fact the farmer whose land faces the improved highway is greatly benefited in that the value of his land is increased, the merchant is benefited in that more goods can be delivered over the roads and more people from a distance are able to come into his stores and in fact all branches of industry are benefited by better roads.

Yet the burden of maintaining these roads bids fair to fall, to a large extent, upon the shoulders of the owners of heavy trucks.



# Transmission Standardization

Establishment of reasonable limits of parallelism and concentricity between flywheel, motor housing and transmission case is important. Manufacturers stand in their own light by refusing to adopt S. A. E. standards.

SOME of the most important parts of transmission gearsets have been standardized by the S. A. E., including the splined shafts on which the gears slide and the corresponding broached holes in the gears, the bell housings, the shaft ends and the tire pump mounting. There remain, however, a number of other features on which—manufacturers feel—standardization work could be done to advantage. What the problems are that confront the manufacturers of transmissions was well brought out in the report of the Transmission Subcommittee of the A. G. M. A. Standards Committee submitted at the recent Rochester meeting by W. H. Lyman of the Warner Gear Co.

Mr. Lyman considers that there are still too many types and sizes of bell housings for unit power plants. He admits that much creditable work has been done along the line of standardizing bell housings by the S. A. E., but unfortunately many car builders do not make use of the standards already adopted and stand in their own light in an effort to reduce cost of production and to meet competition.

The matter of establishing reasonable manufacturing limits of parallelism and concentricity between flywheel, motor housing and transmission case deserves serious consideration. The transmission manufacturer may hold his own work within reasonable limits, but the transmission may be secured to an engine in which the bored hole for the pilot bearing in the flywheel is oversize and not concentric with the snap fit in the crankcase; or, on the other hand, the bore of the crankcase for the transmission flange may be oversize, eccentric and out of parallel with the flywheel. Such misalignment of motor and transmission causes undue bearing wear, transmission strains and gear noise.

Misalignment will also produce a hard-working, grabby clutch action. This is particularly true of the gear-tooth, multiple-disc type of clutch, where there are so many points of contact and where it is necessary to hold the back lash reasonably close to prevent clicking of the teeth on the discs against the teeth cut in the flywheel or in a driving drum fastened to the flywheel. Mr. Lyman said that he had seen many flagrant cases of misalignment of transmissions and engines. For instance, engines where the face of the flywheel to which the clutch driving drum is attached and the face of the crankcase to which the transmission case is attached out of parallel as much as 0.070 in., and the bore in the crankcase to receive the snap fit of the transmission oversize and out of round as much as 0.045 in. Under such conditions it is no wonder that we have clutch trouble and noisy transmission gears.

It is admittedly somewhat easier to hold to close limits on the flange of a transmission case than it is on an engine crankcase, but reasonably close limits may be expected on the part of engine manufacturers. It is proposed that the A. G. M. A. Standards Subcommittee on Transmissions, the Engine Manufacturers' Association and the S. A. E. get together and work out a set

of reasonable tolerances that will insure good working conditions in the clutch, engine and transmission.

One of the problems which the new committee has set itself is to formulate recommended practice regarding center distance, width of face, pitch and pressure angle of gear teeth for given ranges of engine torque. In Mr. Lyman's opinion this problem should be approached carefully. For instance, his company has found it easier to produce quiet gears from oil-hardening than from case-hardening steel, owing to the lesser distortion during heat treatment of the former, and as quiet operation is such an important factor in gear work, the kind of steel to be used should be settled first.

The maker of transmission lubricants and the makers of transmissions have not worked together very closely. The automobile builder discovers that the lubricant he has been using during the hot and mild weather will not answer his purpose during the cold weather, because his customers complain of the hard shifting of gears, so he calls for help from some oil man and, sure enough, the oil man can help him out and furnishes a grade of lubricant that makes the gear shifting somewhat easier but in doing so the change of lubricant produces a howl in the transmission that was formerly quiet with the old grade of oil used. Now, instead of the car builder going after the oil man to meet a gear condition, he goes after the transmission builder to meet an oil condition. Some of the lubricant is so thick that it will not run out of a bucket turned upside down and surely lubricant of this consistency will not penetrate the small hole made in the stems of some designs of drive gears for the purpose of lubricating clutch bearings or other parts. Some improvement in this situation can undoubtedly be made by co-operation between the transmission interests and the oil people.

Another subject that deserves study is the best form of gear blanks. These blanks should be of such form that they can be easily manufactured and there should be no extreme heavy and light sections, as gears of that type usually distort heavily under heat treatment. In the case of small diameter gears with keyways in them, attention should be given to the amount of stock left over the keyway, to see that there is sufficient to prevent cracking.

The subject of wall thickness for transmission cases appears to be in a very chaotic condition at the present time, as wall thicknesses of 3/16 in. to 9/16 in. may be found. With a transmission of given capacity and number of speeds the cases of transmissions are very nearly alike in form and size, and there cannot possibly be such a range in the requirements of wall thickness as indicated by the above figures. The limits on the light side depend somewhat on the ability of foundries to produce sound castings and partly on the requirement of noiseless and vibrationless running, which characteristics are favorably affected by heavy walls. If any standardization of wall thicknesses is attempted it will be done in consultation with good reputable foundries.

# Germany's New Standardized Motor Fuel

Mixture of benzol and alcohol with tetralene has produced excellent results in road tests and races. Can be used with ordinary type of carbureter with no change in the fuel nozzle. Attempts to use tetralene alone proved unsuccessful, which led to government's adoption of the present standard.

By Benno R. Dierfeld

WITH the precipitous decline in the exchange value of the mark, Germany before long will be unable to buy any foreign motor fuel and will be compelled to use fuel of native production. A suitable home fuel for all kinds of motor vehicles is benzol, but, unfortunately, the quantity available for home consumption is inadequate. Another by-product of the German coke industry is naphthalene, which can also be used as fuel in internal combustion engines, but the fact that it is a solid at ordinary temperatures makes it necessary to use complicated devices for preheating, which makes it inconvenient for motor vehicle use.

During the war German chemists succeeded in converting solid naphthalene by catalytic hydrogenation into tetrahydronaphthalene, called tetralene for short. It is a liquid at ordinary temperatures and is produced at the rate of 100 tons and more per day by the Tetralin Co., Berlin W-8. This tetralene, with its high boiling point,

out difficulty in the average vehicle engine. The admixture of these fuels with tetralene also lowers the specific gravity, whereby the necessity for changes in carbureter adjustment is obviated. Exhaustive tests in the Motor Laboratory of the Berlin Technical University by Dr. Schrauth and Diplom-Engineer von Keussler conclusively proved that very good results may be obtained with a mixture consisting of equal parts (by weight) of tetralene and gasoline, having a specific gravity of 0.720 to 0.735. According to Wa. Ostwald, a well-known chemist, a mixture consisting of equal weight parts of tetralene and benzol is an excellent fuel for motor cars and can be used without change in the fuel nozzle.

An important fact in this connection is that alcohol may be added to such tetralene-benzol mixtures in almost any desired proportion, as the addition of alcohol, on account of its water content, influences the combustion of the tetralene in a favorable manner. For this reason a tetralene-benzol-alcohol mixture seemed to be the most suitable fuel of home production for use in Germany. There is at the disposal of the German Government about 60,000 tons of benzol annually (provided only the standard benzol is used in the future); the tetralene works can produce 30,000 tons of tetralene annually and the Government might release 30,000 tons of alcohol for motor fuel purposes. This would yield a total of 120,000 tons of home motor fuel per year, or more than required by German motorists.

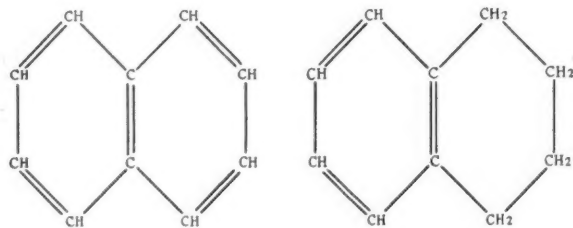
The new German standard fuel, called *Reichskraftstoff*, has the following composition (by weight):

50 parts benzol—25 parts tetralene—25 parts alcohol.

The name and composition are due to the noted chemist, Walter Ostwald. The specific gravity of the standard fuel, 0.865, is about the same as that of benzol, and its heat value of 9000 calories per kilogram (17,200 B.t.u. per lb.) or 8000 calories per liter (54,400 B.t.u. per gal.) is quite satisfactory. A new method of preparation has been developed which overcomes the tendency of the components to separate out when the mixture is cooled off or when benzol or water is added.

The distillation curve of the new standard fuel is most favorable and is shown herewith (in comparison with a distillation curve of gasoline as now sold in the United States.—Editor). The following table gives the proportions that pass over at different temperatures:

Per Cent (Volume)	Deg. (Fahr.)	Per Cent (Volume)	Deg. (Fahr.)
0—10	149—156	60	248
20	162	70	285
30	162	80	379
40	167	90	392
50	189	95	400



Naphthalene Tetralene  
Fig. 1—Diagrams of Molecular Structure

is especially adapted for vehicle engines using a high compression ratio, because it is free from knocking tendencies. Tetralene ( $C_{10}H_{12}$ ) is a uniform chemical compound, and its molecular structure may be represented by the diagram shown at the right in Fig. 1. This structure may be compared with that of the naphthalene ( $C_{10}H_8$ ) from which it is made, as shown at the left in the figure, the transformation consisting in the addition of four hydrogen atoms to each naphthalene molecule.

As stated, tetralene is a liquid at ordinary temperature, water-white in appearance, of a specific gravity of 0.975. Its boiling point is 205 deg. Cent. (452 deg. Fahr.) and its point of solidification or freezing point is very low, minus 30 deg. Cent. (minus 22 deg. Fahr.). The calorific power of 11,600 kilogram-calories (20,900 B.t.u. per lb.) is very high, and the high flash point of 79 deg. Cent. (174 deg. Fahr.) insures safety in operation. Tetralene is not suited for use by itself in present types of aircraft and automobile engines, but by mixing it with fuels of a lower boiling point it can be used with-



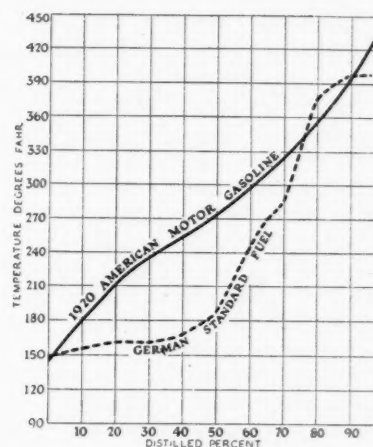
Up to 212 deg. Fahr. 54 per cent of the mixture passes over, and boiling begins at 147 deg. Fahr. Not less than 45 per cent of the mixture passes over at temperatures less than the boiling point of the most volatile constituent. It will thus be seen that in this case a mixture of very good vaporization qualities is obtained from components of comparatively high boiling point.

This standard fuel can be used in all ordinary carbureters without change in the fuel nozzle, but the air should be pre-heated to a somewhat higher temperature than with gasoline. Draining of water from the fuel strainer, as customary with gasoline, is not necessary, as the standard fuel dissolves water, and no trouble is experienced from water in the fuel. As the standard fuel is heavier than gasoline, with the same fuel nozzle the consumption will be less. Starting of the engine involves hardly any more difficulty than starting on gasoline. It should be specially emphasized that this new fuel is no emergency fuel, like the numerous fuel mixtures mentioned by the writer in a previous article in *AUTOMOTIVE INDUSTRIES* of Sept. 9, 1920, but is a convenient and all around satisfactory fuel that will be able to hold its own in competition with gasoline and benzol when the latter are again available in sufficient quantity.

An important factor in connection with any new fuel is the cost. In making a comparison with other fuels it is not proper to do so on the basis of the cost per unit weight or volume; what should be compared is the cost of a certain number of heat units obtained from the different fuels compared. The following table gives the data necessary for such a comparison (all figures relating to costs in Germany only, it has not been deemed necessary to convert them.—Editor.)

	Gasoline	Benzol	Tetra- lene	Alcohol	Stand- ard fuel (50-25-25 mixture)
Spec. gravity....	0.725	0.860	0.975	0.810	0.865
Heat value in calo- ries/kilogram ..	11,000	9,700	11,600	7,200	9,000
Heat value in calo- ries/liter .....	7,980	8,440	11,300	5,830	8,000
Retail price in marks per kilogram (August, 1921).	8.50	5.60	7.40	6.50	6.25
Price of 1000 calo- ries in marks..	0.77	0.58	0.64	0.90	0.69

As to the consumption with the new standard fuel, the tests of Professor Dr. Schrauth are interesting. For instance, a 35 hp. car, the Zenith carburetor of which was adjusted for gasoline, consumed on a run of over 1100 kilometers (685 miles), at an average speed of 40 to 45 km. p. h. (25-28 m.p.h.), only 12 liters or 10.6 kilograms per 100 kilometers (19.6 miles per gal.) with the standard fuel, while the consumption of gasoline of 0.730 specific gravity was 19.8 liters or 14.5 kilograms per 100 kilometers (11.9 miles per gal.). Other cars had similar consumption. With the standard fuel all cars



Distillation curves

showed very good performance, good starting and acceleration, and no popping in the carburetor in cold, moist weather. The highest car speed, which was 90 kilometers per hour (56 m.p.h.) with gasoline, could be increased up to 100 kilometers (62.2 miles) per hour with standard fuel. During the period, Oct. 4 to Oct. 7, the Allgemeine Deutsche Automobil Club, the largest German club, with 25,000 members, arranged a long road race for motorcycles and light passenger cars up to 24 hp.; for all vehicles the standard fuel was prescribed, and good results were obtained. Now the German government has adopted the new standard fuel and ordered its sale instead of that of pure benzol at the government fuel stations.

## Gasoline from Vegetable Oils

IN a recent issue reference was made to experiments by M. Mailhe in France with a view to making gasoline from vegetable oils. The item was not as clear as it might have been. A note presented by M. Mailhe to the French Academy of Sciences fully describes the process employed.

It is well known that the fatty oils cannot be distilled at ordinary pressures without partly decomposing. It occurred to the author that it might be possible to break them up more completely in contact with catalyzers mixed with both hydrators and hydrogenizers, at a temperature of 1000 to 1200 deg. F. To this end one can use to advantage electrolytic copper combined with magnesia, alumina or caolin. The mass is formed into balls with the aid of a binder. These balls are heated in a copper tube. At one end of this tube the linseed oil enters through a capillary tube. The vapors passing through the mass of the catalyzer give rise to two kinds of products, one liquid, which may readily be condensed; the other gaseous, which may be collected in a gasometer.

The liquid products are subjected to distillation and

that fraction which boils up to 300 deg. F. to hydrogenation on nickel at 350 deg. F.

It results from the above that the catalytic decomposition of linseed oil on copper-magnesia, followed by a hydrogenation on nickel of the most volatile products, has the effect of yielding aromatic hydrocarbons. There is a cyclization of the fatty chain, and as the cyclic products thus obtained are free from sulphur, it has been possible to obtain cyclohexane and its derivatives.

It will be seen that this catalytic process permits of obtaining from a vegetable oil, a mixture of gasoline and kerosene which may be used as a motor fuel. The gasoline has a specific gravity of 0.7607 and the kerosene of 0.8644. Both are soluble in alcohol in all proportions.

THE Aerodynamic Section, Bureau of Standards, is constructing a new wind tunnel 10 ft. in diameter. The design for the tunnel is finished and the material for its construction is being rapidly assembled. The completion of this tunnel will give the Bureau exceptional facilities for all sorts of research work involving the study of the behavior of objects in a windstream.

# Elementary Principles of Exporting Are Important

Proper shipping and packing and absolute accuracy in making out drafts and shipping lists may appear to be somewhat minor details in the export trade but they are highly important in the end. Increasing demand for American cars abroad opens an encouraging market for automotive manufacturers. This article was prepared by an experienced exporter.

**A** MERICAN manufacturers produce something over 25 per cent more goods than can be consumed within the boundaries of the country. Production is by no means at its peak and there are many countries that are ready to receive more American goods. This is especially true of American automobiles. Manufacturers, especially those who are comparatively new in exporting, sometimes regard the exporting end of their business as something mysterious; something beyond their ken. It is true that many manufacturers have lost money by attempting to export their goods, but in many cases this has been due to a lack of knowledge of the fundamental principles of exporting.

Fluctuations of foreign exchange, of course, have played an important part in keeping the danger signal before the manufacturer who sometimes feels that he might be able to sell some of his goods in foreign countries. But that is a situation that will be but temporary. It will not be righted in a day, but eventually it will be righted. When that obstacle is removed as it already has been to some countries, the American manufacturer should be ready to step into the foreign markets, and, proceeding along sound business lines, successfully compete with the manufacturers of any other country in the world.

## Basic Points Essential

There are certain basic elementary principles of exporting. These are known to most manufacturers who have shipped their goods directly from their factories to foreign ports, but there are many who have not yet entered this field. Then, too, there are many who have entrusted this work to agents. Extreme caution should be exercised in choosing the man to handle goods at the port of embarkation.

A man who has spent considerable time as a salesman in South America, declared recently that if more manufacturers realized they could forward an article for overseas shipment almost as easily as they can for domestic shipment there would be many more engaged in the export business than there are. While the things he regards as extremely important points may seem of a somewhat elementary nature, especially to the manufacturer who has been engaged in the export business, they are, nevertheless, things the manufacturer should know. A good many people have told of the race characteristics of the Latin-American and other nationalities, and have discussed the psychology of selling in various countries, but most of these writers have taken it for granted that the manufacturer would know what to do with his order after it was obtained. That is where many American manufacturers have failed.

A good salesman will always send forward with his order minute shipping directions, stating the number of copies of the invoice and packing list that are to go out with the draft. These requirements vary in different custom houses. Naturally these instructions should be adhered to.

**The American salesman can usually sell goods in foreign countries, at least once, but if his employer, the manufacturer, does not meet specifications, does not ship his goods properly or makes errors in making out drafts or other papers, the manufacturer has no right to expect that salesman to send in repeaters.**

One of the chief difficulties confronting the shipping departments in the past seems to have been making the contents of the shipping case conform to the packing list. On the surface this appears to be a very minor sort of thing that might happen to anyone whose employees became a bit careless. But it is important. If the contents of the shipping case do not correspond to the items listed the consignee is subject to a fine. Then, too, these exported goods are not being shipped to within telephoning distance, and if shortages occur the buyer is at the mercy of the seller, for the draft is always for the entire amount.

The packing of goods is important in itself. Boxes should be bound with steel strips and, if possible, sealed, for the curse of the foreign buyer is pilferage. Each case should be numbered and the numbers should correspond to those on the packing list. In most South American countries, except in the British possessions, it is necessary to mark on these cases, in kilos, the weight of the case, the gross weight, net weight and the tare. The cubical contents must also be marked. This completes the packing operations at the factory.

## Making the Draft

Then there are the operations in the office. It has been said that 50 per cent of all manufacturers in the United States are unable to understand the difference between a sight draft and a date draft and this confusion has been known to result in rejection of shipments. If goods are sold on terms of 60 days, it is usually understood to mean that the buyer must pay for the shipment 60 days after he accepts the draft. But many drafts are made payable sixty days after the date made out, and no matter how long it may take for the draft to reach the consignee, it is due and payable 60 days after it has been made out at the factory in the country. It should also be remembered in making drafts that the manufacturer must compute the interest covering the



time the draft is out and add the interest charges into the total amount, as overseas firms will not pay interest charges on drafts unless such charges are specified in the order.

All manufacturers' drafts should be attached to packing lists and invoices and can either be sent to the forwarder of the goods, to be attached to the shipping documents, which include consular invoices, ocean steamship bill of lading and insurance certificates. Or they can be sent to the correspondent bank to be held and attached to the shipping documents upon their arrival.

Manufacturers can make arrangements with steamship agents, express companies, or railroad agents to pick up their shipments and forward them, all charges collect, at the port of destination. The shipper can also make arrangements at his bank to discount his draft. In this case he must present to the bank the draft with the invoice, packing list and the railroad bill of lading. A representative of the forwarding agent then gives the bank a trust receipt, covering the value of the documents, and here the manufacturer's identity with the shipment ends, save for the fact that he is liable to his bank for the amount of the discounted draft until such time as the consignee pays the draft and the money is returned to the bank.

In making bills of lading they should be marked, "For Export." This marking entitles the shipments to free storage at the port of embarkation for a reasonable period and eliminates the possibility of the forwarding

agent including in his charges money expended for putting the goods in storage.

Manufacturers should demand from their forwarding agents duplicate copies of the ocean bills of lading, insurance certificates and all forwarding charges.

It is a good plan, in fact almost a necessary one if the order is big enough, to cable the consignee immediately the shipment is cleared, giving him the name of the ship the consignment has gone forward on and the date of departure. If the order is not large enough to warrant cabling then the information should be sent by letter, and enclosed should be a copy of the packing list and invoice. These should be marked "duplicates," and in case the originals are lost the duplicates will be available. These duplicates should be sent by mail even if a cable is sent.

All this information is not intended to be construed as an article on "Exporting Made Easy," for it is not easy. There are many things to be watched, but if they are watched carefully a great deal of trouble can be eliminated. The principles set forth, it is true, are elementary, but in many cases failure to observe these principles have resulted in lost customers. Exporting requires close study and thorough investigation. The reliable salesman in the field is usually pretty well acquainted with the necessary steps to be taken in shipping goods to his particular territory, and the manufacturer would do well to abide by the suggestions the salesman offers.

## Belflex Fabric Spring Shackle

IT is well known that the wear of spring shackle bolts is one of the main causes of cars becoming noisy in operation prematurely, and to eliminate this trouble, improvements in the lubrication of shackle bolts have been made by many designers in recent years. Another method of eliminating this trouble has been adopted recently by several designers, which consists in completely eliminating the familiar spring shackle. The first step in this direction apparently consisted in providing the spring master leaf with a scroll at the end and securing this scroll to the spring hanger, but this method has not achieved any great success, probably owing to weakness due to concentration of strains at the point of attachment. The latest designs for pivotless shackles make use of fabric, and one of them is the Belflex, which is illustrated herewith.

It is claimed for this shackle, which is manufactured by the Belflex Corp., that it requires no lubrication and cannot rattle or squeak; that it will outwear the average spring shackle and that it also performs to a certain extent the functions of a shock absorber.

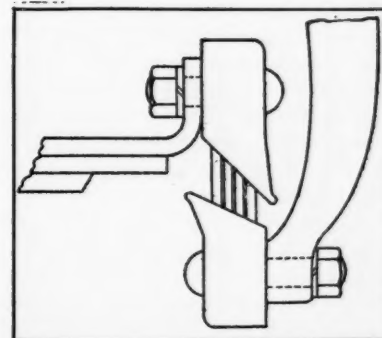
The tension type of Belflex shackle, which is the one here illustrated, is made by clamping together four or more strips of rubberized fabric, which thus form a link or shackle which is bolted fast to the spring at one end and to the frame bracket at the other. The required clamping pressure is obtained when the shackle is assembled on the car, when the nuts which hold the shackle to the spring and to the bracket are tightened up. The clamping faces of the top and bottom boxes protrude at an angle in such a manner that under rebound the fabric strips act as cushion between them, it is claimed. There is an appreciable difference in the

face angles of the two boxes, which is made necessary by the fact that the lower box is at all times rigid, while the upper one moves with the spring.

Thin corrugated separators are inserted between the fabric strips; they supply the required clamping surface and help to transfer the load from the clamping bolts to the cover and load plate. The fabric strips are composed of three plies of 37½ oz. duck, which has been given a skim coat of rubber. The top leaf of the spring is prepared for use with the shackle by punching holes for the bolts in it near the end and then turning the end up to the proper angle for setting the shackle link. The frame brackets are designed to give the link a vertical position under full load.

Endurance tests with these shackles were made at the mechanical laboratory of Cooper Union, New York, and gave results which are said to warrant the claims as to life reproduced earlier in this article.

Belflex spring shackle



# Advances in Power Presses and Dies Due to Automobiles

Demand of automotive industry has caused stage of perfection in forming and stamping operations that was hitherto unthought of. The ability of press and die manufacturers to successfully control the flow of cold sheet metal into certain shapes has aided economic production of cars.

By Henry J. Hinde\*

**T**HE art of producing sheet-metal stampings from a flat sheet while cold has made marked progress in recent years, and many articles are now made of sheet metal which were formerly produced by casting or forging, or in a lathe, milling machine, drill press or at the bench.

Forming and stamping operations especially have in many classes of work become very complex, and the art of drawing sheet metals, stimulated by the enormous demand of the automobile industry in particular, calling for most intricate shapes, has reached a state of perfection hardly imagined possible a few years ago. The results achieved by the ingenuity of the present-day press and die designers, and to no small degree also by the metallurgist, who comes into consideration through his improvements of the physical qualities of the metals used, are indeed revelations in economy of production, strength of stamped articles and the absolute interchangeability and beauty of appearance of the finished products.

## Development Due to Automotive Industry

The development of power presses, together with that of dies and special tools, has been so marked in the last twelve years, principally because of the demand for intricate stampings for the automobile trade, that it is believed a far greater advance has been made than at any other period in the history of the business. This development has not wholly been confined to the working of sheet metal, for, as previously stated, the demand for accurate duplication of parts and the great quantities in which they are desired has resulted in power presses being used for sizing forged steel parts which were formerly finished by means of saddle milling and similar operations. It has been found that manufacturers can produce greater quantities with much greater accuracy and with such a reduction in machine shop production expense by the use of what is known as knuckle-joint or cold-swaging presses in sizing the finished working surfaces on these forgings, that a number of equipments have been installed for work on steering knuckles, brake levers, connecting rods and other similar forgings and castings. These presses are built in sizes capable of exerting a pressure up to 2000 tons and over, and it is claimed that size limits of 0.001 in. can be successfully maintained in operations of this character.

Although this marked advance is due to the automobile industry more than to any other one factor in re-

cent years, at the same time the economical production of motor cars was made possible solely on account of the ability of the press and die manufacturers to successfully control the flow of the cold sheet metal into certain forms and shapes, by means of properly constructed dies and presses of such power and design that wonderful results have been obtained. As an illustration of this a wire-wheel hub is shown in Fig. 1.

This hub requires a blank 16½ in. diameter and 5/32 in. thick. Attention is called in particular to the numerous niches or pockets successfully formed into the circular shape, and also to the fact that the stamping was first drawn to a considerable depth at the narrow neck. The end of the neck or bottom of the stamping was then removed and this metal was made to flow back and expand to a considerable degree beyond its former small diameter without even stretching or thinning the metal in the reforming operations, thus proving conclusively how successfully the metal was controlled and forced to flow back into its larger diameter with an opening in the bottom much smaller than the former small diameter of the neck of the stamping.

In the production of brake drums, front and rear hubs and spoke flanges the conditions that have to be fulfilled by the dies are that the product shall be absolutely interchangeable; that no machine work shall be performed upon the stampings when coming from the press, excepting some reaming and thread cutting, and that the strength of the material shall remain unimpaired. In addition it is imperative that all cylindrical parts be smooth and true and of standard diameter, allowing less than the commercial tolerance of variation. The work involves a most careful planning of the interrelation of the several operations, so that at no time the material shall be overstrained or reduced in thickness, and that the dies shall not be subjected to excessive wear in order to maintain uniformity of size.

## A Straight-Column Press

A straight-column press has been developed especially for such work by the Toledo Machine & Tool Co. which is of unusually rugged proportions and weighs about 145,000 lb. It is double-gearred with a ratio of 40:1 and fitted with a very powerful friction clutch in combination with an effective brake and hand-lever control, so that the machine may be started or stopped at any part of the stroke of the slide up or down. The frame consists of four pieces—the bed, the two uprights and the crown—which are held together by four massive tie rods passing through the said crown, uprights and bed. When the frame is assembled these tie rods are

\*President and General Manager of The Toledo Machine & Tool Co. From a paper presented before the American Society of Mechanical Engineers.



heated. The nuts are then screwed home and the rods permitted to cool. In this manner, through the tendency of the rods to shrink, an enormous pressure is exerted by the rods upon the frame that renders the entire structure practically an integral one and brings all the working stress upon the tie rods.

Axle housings are made of steel plate up to 5/32 in. in thickness, and the requirements are that the stampings be perfectly straight and flat so that when the two halves of a housing are joined together by welding they form a perfect casing without warp. A powerful double-crank press developed for this purpose weighs about 95,000 lb. and is capable of forming and stamping cold at one blow axle-housing halves about 40 in. in length of steel plate up to 5/32 in. in thickness, the blank having been cut previously to proper shape.

One modern form of toggle drawing and deep-stamping press, such as is used for making engine pans, radiators and other similar articles of the comparatively lighter gages of metal, has two slides, an outer slide for clamping the blank and holding it while the work is being drawn, and an inner slide for doing the drawing, stamping and forming operation. Presses of this character are also made in the double-crank type with a considerable distance between the uprights and weighing as much as 600,000 lb. Such presses are used for body forming, for making cowls, dashes, fenders, etc.

#### Special Designs

The forming of channels and side rails for automobile frames and similar requirements has resulted in the designing and building of special presses particularly adapted for this work. The side rails, for instance, are preferably first blanked in a double-crank press as much as 218 in. between the uprights. The largest sizes of these presses weigh in the neighborhood of 500,000 lb.

The forming operations are performed in a specially designed press, the outstanding feature of which is that

the operation is diametrically opposite that of the ordinary toggle drawing or deep-stamping double-action presses. The channel-forming press has a movement entirely mechanical that brings the tools down and at rest on a flat blank, or sheet, by means of a toggle motion, and in this position the machine is capable of a resistance pressure upward of 2000 tons. While this first toggle movement is at rest, another movement is brought into play, forming up the sides of the channel or frame. The machine in its operation completes the one cycle when the stamping lies on the face of the dies completely formed, with the result that the web, or bottom of the stamping, remains as flat as it was in the original sheet. In other words, the bottom or web of the channel is held perfectly flat during the operation. Several of these presses have been built and are in most successful operation. They weigh upward of 600,000 lb. each. One of these presses with five men will do the work of three hydraulic presses with fifteen men, to say nothing of the large force required to straighten the rails when hydraulic presses are used.

Still another interesting feature that the automobile trade has developed is the smoothing-out process for certain of its stampings, more particularly the tapered, stamped-steel radiator front or casing. Because of its slightly tapering form it was found difficult to produce a stamping for this piece so free from waves, or buckles, that it would show smooth over the finally enameled and varnished surface. The requirements were successfully met by developing a set of tools to receive the finished stamping and allow an exceedingly small space for water to flow just inside of the stamping around the steel form supporting the stamping. It was necessary to exert a pressure of some 2000 tons on the outer surface of the stamping to prevent seepage or leaking, and to supply water to the die through a 3/4-in. pipe by means of an accumulator with sufficient force to smooth and iron out the unevenness and waves in the original stamping.

## Keeping a Rubber Factory Clean.

**F**ACTORY cleanliness under the direction of a Sanitary Department was described in an address delivered by William Jameson, advisory engineer of the Fisk Rubber Company, before the National Safety Council at Boston recently. Mr. Jameson said that in one rubber factory a sanitary department was organized about two years ago under the supervision of a man who had no other duties than to keep the plant clean. A considerable amount of discussion and many conferences were held before any attempt was made to get under way. A few of the sweepers who were then under the supervision of production foremen were taken over; a week or so later another group was transferred to the sanitary department, and so on, until the entire group of sweepers had been transferred.

Immediately better results were obtained at a considerable reduction in cost. Some difficulty was encountered at first in defining the duties of the sanitary department in view of the fact that these men had been called upon to carry on so many different activities under the old plan. This condition was easily adjusted and in some cases it was necessary for the foremen to hire a helper to do the work the sweeper had been doing. In the plan in operation at this factory one superintendent exercises general supervision over the entire department assisted by two foremen—one for days and one for nights.

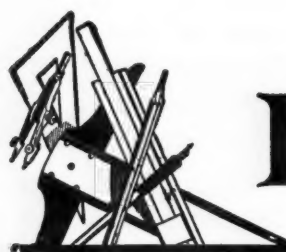
Three squad leaders of recognized ability—two on the day force and one on nights, perform emergency work and work with and check men when in squads or on special work.

During the day, in departments or locations where litter accumulates in great quantities, one or more sweepers are assigned and put in all their time in one locality. For the most part the sweeping is done by placing men in two squads, each squad looking after certain sections of buildings, covering all sections at least once daily.

The night sweepers work in one squad and usually start at the top floors and work to the basement, returning in the early morning to clean those places where the plant has been operated at any time during the night.

The entire day force and many of the night force work Saturday afternoons and make a general weekly cleaning, as most of the machinery is idle then and the sweepers have the opportunity of doing a thorough job.

In addition to maintaining plant sanitation, the sanitary department is also held responsible for provision of adequate toilet and washing facilities, in compliance with state rules and regulations. Moving of departments from one location to another, the changing from male to female help, etc., requires considerable vigilance to keep the matter within the law.



# The FORUM



## Cause of Skidding at Turns

Editor, AUTOMOTIVE INDUSTRIES:

I have never been able to comprehend what seemed to me an adequate cause for the skidding of an automobile. The following considerations may be valid; I have never seen them in print.

In rounding a curve, the front wheels get into the straight-away while the rear wheels are on the curve. In addition to the deceleration of the rear wheels as they approach the straight-away there must be an inertia effect due to the fact that the inside and outside wheels are moving at different speeds while on the curve and at the same speed when they have entered the straight-away. I do not know how quickly this change takes place, but it would seem to be but a very short time.

Referring to the accompanying sketch, assuming arbitrary and perhaps impossible data for the purpose of illustration, suppose the inner wheel to be turning in a 10 ft. radius and the outer wheel in a 15 ft. radius. Then the inner wheel might be moving 12 ft. per sec. and the outer wheel 18 ft. per sec. at the position A.

Suppose we take 100 lb. as concentrated at each wheel.

The outer wheel would have  $\frac{(18)^2 \cdot 100}{64}$  foot-pounds of energy stored in it and the inner wheel  $\frac{(12)^2 \cdot 100}{64}$  foot-pounds of energy.

If on the straight-away they are both going at the rate of 15 ft. per sec., the outer wheel would have lost about  $\frac{(18)^2 \cdot 100}{64} - \frac{(15)^2 \cdot 100}{64} = 211$  foot-pounds of energy and the inner wheel would have gained about  $\frac{(15)^2 \cdot 100}{64} - \frac{(12)^2 \cdot 100}{64} = 126$  foot-pounds of energy.

If this change took place in one-tenth of a second it would have caused a pressure of 2110 lb. on the outer wheel and a pull of about 1260 lb. on the inner wheel.

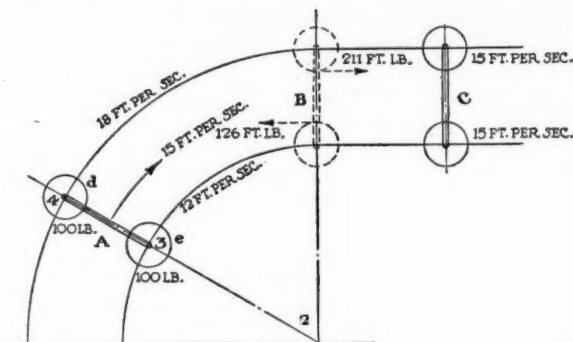
This might have a bearing on the spring suspension also.

These effects remind one of an athlete using a pair of dumb-bells to extend his jump.

E. J. STODDARD.

We doubt very much whether there is any particular tendency for a car to skid at the instant the driver straightens out the front wheels. In fact, this motion is the same as that which is commonly used to correct a skid.

Our explanation of a skid on a curve is as follows: The centrifugal force on a car while going around a curve tends to cause the whole car to leave its circular path radially. This tendency is resisted by the adhesion of the wheels to the road. The centrifugal force acts at the center of gravity and may be divided into two components, along the front and rear axle axes, which are the center lines of the two resisting forces. These components will be proportional to the weights on the front and rear axles, respectively. If the resisting forces (resistance to lateral skidding) were also proportional to the weights on the



respective axles, as they might be supposed to be, the front and rear wheels would begin to skid at the same time and there would be a sideways sliding of the whole car, instead of the slowing action which actually takes place. But owing to the driving force on the rear wheels the adherence of these wheels to the ground is probably much less than that of the non-driving front wheels. The result is that the centrifugal force and the lateral resisting forces are no longer in balance and the car slides more easily at the rear than at the front. Therefore, when the centrifugal force becomes great enough, skidding begins.—Editor.

## Low Unsprung Weight Axles and Spring Action

Editor, AUTOMOTIVE INDUSTRIES:

The universal joints in the DeDion type of drive are subject to the propeller shaft torque times the reduction rate divided by two, because of the balance gear. In such an example as was cited in your editorial of Nov. 3, the torque at the universal joints would be twice that of the propeller shaft, but at one-fourth the number of revolutions. Hence joints made sufficiently stiff to stand the torque would be very durable. The short rigid Cardan shafts running at low revolutions reduce to very small values the radial stresses due to unbalance or whip. The universal joints of the DeDion drive system are by no means as severely loaded as would appear from casual inspection.

It seems that the up and down motion of the wheel in the Rumpier system would vary the angular velocity of the drive to an unusual degree, and that it would be necessary to introduce an elastic member, such as a long propeller shaft, between the engine and differential to absorb this variation.

The Cowey suspension is very interesting. The writer at one time felt that the "sympathetic" action shown should be included in the cross spring design, but was discouraged by the complication involved. This seems to have been worked into one of the late cross spring constructions.

At one time a trial was made by securing two front half elliptic springs to a front axle in the usual manner, and then the eyes of the opposite springs were connected by long rods, threaded so that tension could be applied, draw-



ing the spring ends toward one another; thus twisting the spring slightly. This reproduced conditions where the springs were twisted, either by improper installation, or by centrifugal force, or by one wheel rising more than the other. The axle was inverted, with the springs resting on the floor, and a lever was used to press down the axle, thus flexing the springs. The spring action was found to be very erratic—a sort of flip flap—snappy motion, such as would be felt when pressing the bottom of a pan inward and outward. Take a flexible piece of steel, like a spring rule, and attempt to twist and bend it at the same time, and the peculiar action will be realized. Some such action may be accountable for the peculiarities exhibited by suspensions—for instance, the excessive stiffness recorded in the seismograph tests made by Dr. Liebowitz.

JOSEPH W. RIDGWAY.

### Uniformity in Fuel Quality

Editor, AUTOMOTIVE INDUSTRIES:

The recent editorial in AUTOMOTIVE INDUSTRIES regarding the necessity of Improving the Fuel as well as the Engine is very much to the point. It is quite possible to-day to build engines that can operate on almost any

liquid that will support combustion, but only along certain narrow lines would there be a chance of their being commercially successful. The great automotive industry and the equally great industry of supplying the required fuel were both built up on the foundation of a source of power of extreme simplicity embodied in the now more or less conventional gasoline engine. In spite of the education of the public in handling things mechanical any great departure from this simplicity will be a serious handicap to both industries.

I do not believe that we will have to fear any such result if the oil industry will really try to produce a fuel that can be handled satisfactorily in engines of simple form. The general characteristics of such a fuel are being better understood every day.

In closing I want to say a word regarding uniformity in the quality of fuel. Without a reasonable degree of uniformity we cannot expect to get any really economical operation. The automotive engine to be satisfactory must be to a large extent automatic in its operation. Wide variations in fuel characteristics in viscosity and evaporation temperatures will inevitably lead to waste because of the impossibility of correct metering or the proper application of heat.

HENRY M. CRANE.

## The Market in British Soudan

THE report on Anglo-Egyptian Soudan for 1920, written by Maj.-Gen. Lee Stack, the Governor-General, has just been issued by the British Department of Overseas Trade. The country continues to prosper, but ever-recurring throughout the report is the cry that lack of transport is holding the Soudan back. Difficulties of transport retarded trade with Abyssinia, held up lumber operations, rendered it impossible to transfer grain to famine areas, kept the produce of Darfur, Mongalla, and Nuba Mountains rotting in these provinces, forced Kasala cotton to rely on an insufficiency of camels, and restricted vaccination when a fearful epidemic of small-pox broke out in the Upper Nile.

The Soudan Government expects to have a \$4,000,000 budget surplus this year. This would be well spent in improving transport facilities. Work along this line has already started, however. Stone quarries and cement factories are being worked, forest and other roads are being built, wells are being bored so as to make arid areas accessible, and Khartoum (whose roads are considered too wide!) is being laid out afresh. A motor transport service has been instituted between Tonga and Talodi, while a fleet of surplus army trucks has substituted worn out cars on the Rejaf-Abu (Belgian Congo) road. Freight rates high on this route because gasoline is expensive and rubber tires cannot last on the rough roads. It is thought that iron-tired steam wagons will ultimately take the place of these trucks. Five applications were made to the Government for mechanical transport concessions last year. As it is not prepared to grant route monopolies to private concerns, however, no further action has yet been taken by the applicants.

The Soudan imports practically all its fuel. Both the Shell and Anglo-Persian groups are at present negotiating with the Government for the right to prospect for oil in the Red Sea littoral. Since oil has been struck in adjacent coastal regions there seems a chance that borings should prove successful. The Soudan Development Co., using charcoal-burning tractors in the country, is experimenting in growing wood of rapid growth for the purpose of maintaining fuel supply. The experiment, if successful, is regarded as being of importance.

As matters stand, the Soudan does not appear to be an attractive field for exporters looking for immediate sales, but the country has, without doubt, a big future, and an agency at Port Soudan or Khartoum should ultimately prove remunerative.

### Official Report on R-38 Disaster

THE official report of a court of inquiry appointed to look into the disaster to the R-38 throws some further light on that tragedy. It is brought out that the airship, having completed some 30 hours' trial, including 15 minutes at full speed—60 knots—was flying at a height of about 1200 ft. She was carrying out rudder and elevator tests at a speed of 45 to 50 knots. Almost extreme helm with a quick reversal was being used, which brought a heavy force on the after portion of the hull, due to the swing of the stern.

During this maneuver the structure failed between frames 9 and 10, the first indication of which to ground observation was a slackness of the fabric at this particular point.

The ship then broke into two portions. The forward portion caught fire at the fracture, at the moment of or shortly after separation. The fire probably originated in a spark from the electric leads, which became fractured at a point in the immediate vicinity of a similar fracture in the fuel mains. As all sources of electrical energy were situated in the forward portion only, the rear portion was not affected, as electric leads in the latter portion became dead immediately the fracture took place.

The fire in the forward portion spread rapidly, due to the presence of escaping gasoline in the keel. An explosion followed, which led to the collapse of the structure and the ignition of the liberated hydrogen gas.

A second explosion took place when the forward portion reached the water. Meanwhile the after portion descended comparatively slowly, but did not catch fire. Four of the five survivors were in this portion and were rescued uninjured.

# Marketing Costs and Their Tendency to Increase

Production economies are not likely to be secured rapidly enough to offset higher cost of distribution. The costs, therefore, must be reduced by a more efficient method of marketing. Increasing competition demands lower prices and to meet this demand all avoidable waste must be eliminated.

By Harry Tipper

**A**N examination of commodity prices extending over a period of the last century indicates that there were two periods of rise and fall, or what is termed "the long swing cycle of prices" in this century of consideration.

The low point reached between the War of 1812 and the Civil War is considerably higher than the low point reached about 1897, while the peak reached during the Civil War is not so high as the peak reached after the World War in 1920.

If a similar curve of commodity prices be taken from Great Britain from the Napoleonic War to the World War, this curve will show a general decline in prices up to 1896. The Crimean War and the Boer War did not disturb the economic fabric of Great Britain sufficiently to introduce a full peak.

At the close of the Napoleonic War from 70 to 80 per cent of the wholesale price of the commodity was involved in the materials, labor and capital required to produce the commodity.

In 1896 from 40 to 50 per cent of the wholesale price was required to furnish the labor, and raw materials and capital for production. In this period of declining prices the percentage of the sales price involved in the distribution and marketing grew larger, while the percentage of sales price involved in manufacturing the products became smaller.

During the period of rising prices since 1896 the percentage of the sales price involved in the work of distribution and marketing has increased still further, so that there has been no change in this tendency.

An examination of these statistics indicates very fully that the concentration of manufacturing in larger units has been accompanied by a constant increase in the cost of distribution and marketing from those points.

Up to about the year 1900 the increase in the cost of distribution and marketing was more than absorbed by the increased economies effected in production and manufacturing, so that the sales prices could be reduced. Eliminating the peak produced by the Civil War, there is constant diminution in the sales price for nearly a century, due to the growth of machinery and machine methods, improved equipment of manufacturing and pro-

duction and the possibility of increasing the productivity of labor by these means. Improvements were made in the methods of distribution by the extension of the newer systems of transportation and their development, but these improvements were not sufficient to offset the constantly increasing requirements of distribution and marketing and the increasing proportion of the total cost entering into those elements of business.

Reading from the past history there is no indication that the cost of distribution and marketing will decrease. In fact, the costs have had a tendency to rise more sharply during the last twenty years and this would indicate the general tendency of distribution and marketing to absorb a larger percentage of the sales price as the area of marketing increases and the intensity of competition becomes more severe.

In common with other lines of industry, the automotive manufacturer faces the probability of increase in the costs of marketing and distribution due partly to the increased difficulty in finding a market and partly to the intensity of competition for every portion of the market. It is not probable that the production economies can be secured at a sufficiently rapid rate to offset the increased cost of marketing and distribution, and consequently the elements of marketing must be analyzed more carefully in order that the wastes may be eliminated and the costs kept down by a greater efficiency in the methods. Even with bulk material, the price paid by the user of the material is usually double the cost required to produce the material and in the case of commodities passing through a number of different hands, when they arrive at the user, the final price is frequently 500 to 600 per cent more than the original production cost.

A considerable part of this cost comes under the head of avoidable wastes.

The organization of any establishment in business is in the best economic position when its marketing efforts are limited to the least amount of territory or area required by the character of the consumption and the intensity of the competition for that commodity. One of the largest elements in the avoidable wastes of marketing has been the tendency to the extensive cultivation of markets, because of our ignorance of the laws governing the cost of

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**T**HE growth of the automotive industry in the past has been rapid because there was a heavy demand for a product that superseded less efficient methods. That demand has been met to a great extent and the future growth of the industry will be in proportion to the general growth of the country from a standpoint of population, wealth and business activity. The old marketing methods that were justified because of the abnormal demands upon the manufacturer, must be discarded and more scientific and efficient ones installed.

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marketing and our ability to sell irrespective of that cost so long as the manufacturing capacity was not much more than the market requirements demanded.

Since the Civil War, during the years of declining prices following that period, the economies in manufacturing came with such rapidity that the wastes in marketing were easily absorbed unnoticed and the prices could be reduced without respect to the marketing wastes.

During the era of rising prices the manufacturing capacity of the United States was not larger than was required to meet the possibilities of the domestic market, and, as a consequence, there was not sufficient competition for the markets to require the reduction of price regardless of cost.

With the surplus manufacturing capacity possessed by the United States at present, the competition for the market will demand the reduction of the sales price to the lowest possible denominator and this cannot be done profitably without a re-examination of the marketing methods and an entirely new study of the economic basis upon which they should be considered.

It is common knowledge that in a large business, dealing with large volumes of material, in accordance with the law of diminishing returns the cost of getting a unit of sale increases as the volume grows, but no attention has been paid to the economic limit beyond which it is not profitable to increase the volume of sales on the present basis of efficiency.

Manufacturing establishments have been increased, because of the supposed possibilities of an increased market. While the increase in manufacturing has been justified during the era of rising prices, to secure a volume sufficiently large to take up this manufacturing capacity under present conditions may eliminate the possibility of profit, unless the proportionate cost of the market can be decreased by the introduction of better methods and the elimination of the present wasteful elements in the attempt to secure the orders.

In the automotive business particularly, the rapid absorption of these units of transportation into the economic fabric has built up a manufacturing capacity and a price condition, including an enormous number of inefficiencies and wastes extending all through the manufacturing end and becoming very obvious in the methods of marketing adopted. Because of the demand created by the necessity of absorbing this unit of transportation in adequate quantities, the price had no special relation to the cost and it did not suffer from any great intensity of marketing competition.

The automotive business is now approaching the period when having taken its place as an integral part of the social and business fabric, its growth will depend more exactly upon the growth of the whole fabric. In other words, its progress will be limited more definitely to the general progress.

Up to the present the business has grown much faster than the total population or the total wealth of the country, because it superseded less efficient methods and required this growth after it had proved its value. That adjustment is about over, and its future growth will be only in proportion to the general growth from a standpoint of population, wealth and business activity.

In the course of this rapid growth, speed of production and large contact with the market were the important elements of the problem to be met. Under such circumstances wastes of all kinds crept into the business end. With the large potential market in front of the automotive manufacturer, wide, extensive marketing methods carried with little relation to their efficiency were perhaps more suited to the conditions.

These conditions have changed and the marketing methods justified because of these conditions must be thrown to one side and newer methods adopted, more analytically determined and with strict knowledge of the manufacturing establishment, in proportion of its production in relation to the total market possibilities.

## Peruvian Business Situation

IT is difficult to determine the number of automobiles in Peru. Returns from the provinces are slow in coming in, and in some cases do not arrive at all. For Lima the municipal authorities give the following figures:

Automobiles for public hire.....	629	
Private automobiles .....	1300	
Trucks .....	300	
		2229
Assuming there are half as many automobiles and trucks outside Lima as in it, we have.....	1114	
Total number of automobiles and trucks in Peru...	3343	

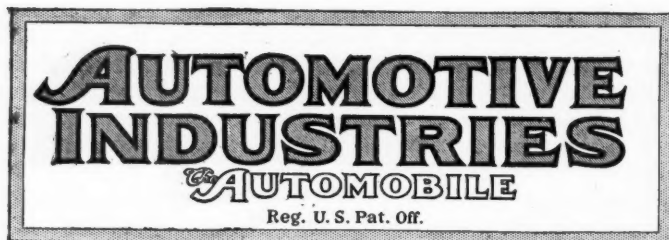
There are, however, probably more than this. From 1909 to 1920 there were exported from the United States to Peru 4836 automobiles and trucks. Enough more cars and trucks have been exported from the United States to Peru during 1921 to raise the number to 5000. Allowing that 25 per cent have been worn out, or destroyed by misuse, this leaves 3750. But no account has been taken of automobiles that came from Europe to Peru during the past ten years, some of which are to be seen in Lima.

The Peruvian import statistics for automobiles at first gave only the value; then weight and value; and beginning with 1917, weight, value and number, for automo-

biles, but only weight and value for trucks. In the subdivisions for weight and value the countries are indicated from which the goods came, but for number only the total is given without reference to country of origin. No figures are yet available for 1920. For the three years for which data are available Peruvian statistics show that the importations of automobiles alone, trucks not included, amount to 1798. Taking into account the number of automobiles and trucks that have come to Peru from Europe, it may not be erroneous to assume that there are 4000 automobiles in Peru, either running or that may easily be put in running condition if the owner desires.

There are probably 1000 tractors in Peru. Almost all leading North American makes are represented, and many European. A light tractor of 20 hp. and three plows seems to be the favorite. As Peru is a land of large farms, plantations or ranches, it would seem to lend itself well to the exploitation of the power idea in farming, and furnish an excellent territory for future tractor business.

Almost all leading makes of North American automobiles are in use in Peru, from the light car to the limousine, it being surprising how many high grade cars are to be found in the republic. Records of the municipality show that not more than 10 per cent of the cars and trucks in Lima are of European make.



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## Is a Fuel Stringency Near?

MOTOR fuel has recently been cheap; hence the need for economizing in its use has not been appreciated. There have, however, been recent marked increases in the price of crude oil and this has already been reflected in an increase in the price of gasoline. The fact that this has occurred at a time of year when the price of this commodity usually undergoes a seasonal decline is significant and the reason is not far to seek.

For several years our domestic consumption of petroleum has exceeded the domestic production. The widening gap has been filled largely by imports from Mexico. The Mexican fields, which have been phenomenal producers, have, with one important exception, gone to salt water, and their potential production fallen off with great rapidity. During the first half of the current year nearly one-quarter of our petroleum supply came from Mexico. The supply from present Mexican fields is extremely uncertain. Obviously, then, the oil situation in the United

States is in a critical state. Mexican crude is not rich in gasoline, but it has had a vastly important effect upon the price of domestic crude, and it is this price which must, in the last analysis, control the price of motor fuel.

Even in this year of general business depression petroleum consumption has continued to increase. It will continue to increase until price changes interfere, but there is nothing to indicate that petroleum production can continue to increase in proportion to increased demand. It seems certain that we shall never be able to produce enough crude in this country to meet the domestic demand unless a great increase in price materially curtail consumption. With the Mexican oil supply rapidly failing there is good reason to expect a fuel stringency with swift advance in price.

It is idle to assume that newly discovered domestic oil fields will result in a sufficient production to keep pace with a steady increasing consumption, for such discoveries have failed to do so for many years past. More oil will be discovered in this country, but that the quantity thus made available can replace the failing supply of existing fields, much less keep pace with an ever increasing demand, is incredible.

The obvious deduction which the automotive industry must face, unpleasant though it may be, is that motor fuel is practically certain to advance rapidly in price in the not distant future. We do not say that there will be a serious shortage of fuel in the near future, but we do anticipate a stringency in the supply which will mean considerably higher prices and have a pronounced effect upon automotive sales.

It is easy to argue that fuel cost is not a large item in the operation of the average car or truck, but it certainly is in the case of vehicles at the lower end of the price scale. A vehicle which uses three gallons of fuel a day 300 days in the year will cost the owner, for this item alone, \$270 a year with fuel at 30 cents a gallon. For a car costing around or under \$500 this is indeed a serious item. Suppose, now, that fuel doubles in price. At the same rate of consumption it is easy to see that the annual fuel bill would nearly equal if not exceed the first cost of the car. That such a situation would materially increase sales resistance can scarcely be doubted.

The only apparent way in which the automotive industry can combat this situation is to build more efficient vehicles—machines which travel much further per gallon of fuel. Better carburetion and vaporization systems are a step in the right direction, but only a step. We must have cars which are inherently more efficient—which travel more than twice as far per gallon of fuel as most cars now being turned out. It is not impossible. It is in fact well within the bounds of our present knowledge. It will, however, require study and experimentation and these require time. Therefore they must be started at once if the detrimental effects of a period of fuel stringency are to be mitigated or largely avoided.

We have published and shall continue to publish articles pointing the way toward more efficient engines and vehicles. Constructive comment in this connection from our readers will be appreciated.



## Measures to Create Employment

**I**N a recent issue of AUTOMOTIVE INDUSTRIES is an article setting forth the measures recommended at the President's Unemployment Conference for permanent relief from the present situation. Those measures, however, deal with questions of an economic nature, and, while they will have a direct bearing on the unemployment situation, they could scarcely be called emergency measures. There is little chance of any of the questions discussed becoming effective immediately, and the big problem confronting the entire country is how to lessen suffering during the coming winter months.

The conference did not forget this question, by any means, and the proposals made, if carried out conscientiously by industry, civic bodies and municipalities, will have an immediate effect in reducing the number of men who are out of jobs.

Aside from recommending a revival of the building industry, appropriations for more road building, co-operation of employment agencies, winter house cleaning and other relief measures, the conference suggested a few ideas for the manufacturer to consider. Among these suggestions were:

Part time work, through reduced time or rotation of jobs; manufacturing for stock; plant reconstruction and cleaning, with the consequent transfer of many employees to other than their regular work; reduction of the number of hours of labor per day; reduction of the work week to a lower number of days.

All these proposals can help the situation. Part time work will not give the workmen as much money as they are accustomed to, nor perhaps as much as they need, but it will at least keep them off the streets during the period of depression. The manufacturer is not the only one facing hard times, for his men are being forced to undergo privation and want until the factories of the land can return to their normal output. Plant reconstruction and cleaning could well be taken up at the present time, when only part time schedules are being operated upon.

## The Human Side of Industry

**"I** AM one of those who is strenuously opposed to any onslaught on organized labor at this time," said one of the best known and most respected engineers in the country the other day. "The American people," he went on to say, "are said to have a genius for organization. Regardless of what happens, workers, like every other class of our population, are going to have an organization of some kind. Organized labor at present is dominated by the higher types of skilled labor. If it were possible to destroy the present organization, there would be likely to arise in its place an organization dominated by the lower grades of intelligence comprised in the unskilled classes."

This is a point of view worth consideration, for other reasons as well as those given by this prominent engineer. Fundamentally the labor problem is not one of organization or of mass movements. It is distinctly a problem of individual study. The relation of the individual to his work, the opportunity which

that work gives for personal development and the factors of incentive involved are of primary importance in any consideration of the human element in industry.

There is no manufacturing problem more important in modern industry than this task of effectively adjusting the relation of the worker and his individual development with the ordinary work of industry. Only a certain part of the time of management can be spent in studying this important problem. It is essential, therefore, that as little energy be wasted as possible and that the time spent on the human problem be utilized constructively in study and experimentation rather than in mere battles for temporary advantage.

## More Air-Cooled Engines

**T**HAT we are on the threshold of renewed activities in the air-cooled field is quite evident. While much of this activity is no doubt caused by reports which have been circulated throughout the trade for a year or more that one of the largest companies in the industry has been developing a product with air-cooling, other interests have also been actively engaged in research along this line.

There is an increasing demand for higher thermal efficiency as one of the means of conserving fuel, and some engineers believe that air-cooled engines are inherently more efficient than the water-cooled type. It is quite certain that some things have been found out regarding air-cooling which will make it possible to overcome some of the few objections which have been offered to this type of engine. It is a significant fact that the one air-cooled car which has been manufactured in quantity has been highly successful and the earnings of this producer have been one of the remarkable accomplishments of the industry. It is certain that by the elimination of the water system, a certain amount of weight can be saved, which will have its effect on the economy. If the air-cooled engine runs at higher working temperatures it may, under certain conditions of operation, prove more economical. If the working temperature is higher than in the water-cooled car, there may be certain advantages in vaporization of the fuel which are also secured and which tend to increase the mileage possible per gallon of fuel.

Air-cooling in the past has been limited to a certain maximum size of cylinder, according to the views of many advanced engineers. However, it seems that discoveries which have recently been made in new cooling methods and particularly in increasing the effectiveness of the cooling fins may result in increasing the maximum cylinder size. If there is going to be a demand for smaller, higher economy cars, the average cylinder size will decrease and the difficulties of air-cooling will be lessened.

At any rate, we are surely on the eve of some important announcements in this field which will be anticipated with great interest by all automotive engineers. This is particularly true, as the field is not restricted to passenger cars, but covers trucks, stationary powerplants, tractors and aircraft as well.

# Eliminates Tire Mileage Guarantee

## Rubber Association Makes New Warranty

### Action on Product Claimed Defective Will Remain Optional With Makers

NEW YORK, Nov. 14—After an exhaustive consideration of the subject of mileage guarantees on tires, the tire manufacturers division of the Rubber Association of America has adopted the recommendations of a special committee providing for elimination of mileage guarantees and the adjustment abuses which have resulted. As a substitute, manufacturers have adopted the following standard warranty:

"We do not guarantee pneumatic automobile tires for any specific mileage, but every pneumatic automobile tire bearing our name and serial number is warranted by us to be free from defects in workmanship or material.

"Tires claimed to be defective will be received only when all transportation charges are prepaid, and when accompanied by this company's claim form duly filled out and signed by owner. If, upon examination, it is our judgment that the direct cause of the failure of the tire to render satisfactory service is attributable to faulty material or workmanship, we will, at our option, either repair the tire or replace it for a charge which will compensate for the service rendered by the returned tire, based upon its general appearance and condition.

"Pneumatic automobile tires in which a substitute for air has been used, tires used when not inflated to the pressure recommended by us, used under loads in excess of those recommended by us, used on wheels out of alignment, abused or misused, used on rims other than those bearing these stamps ( ), ( ), ( ), or which have been injured through accident or design, are not subject to claim hereunder.

"This company does not authorize any dealer or agent to make any other or additional Guaranty or Warranty."

This standard manufacturers' warranty would be printed on price lists, tags and stickers accompanying tires much in the same manner as the former guaranty was used. In announcing the change in policy which has been agitating the tire industry for years, the following statement was issued by the Rubber Association of America:

"A movement is well on the way to adoption throughout the tire industry to eliminate the chief evils which have for years caused loss to consumers, dealers and manufacturers through improper claims for adjustment, and manufacturers and dealers are working in harmony to produce the desired result.

"Motorists who take good care of their tires are the strongest contributing factor to future economy in tire costs. Adjustments based on claims other than because

of manufacturing defects strike at the efforts of the industry to secure tire economy. Dealers have been placed in the embarrassing position of losing the good will of tire users and manufacturers have borne the brunt of the loss due to claims which have arisen out of public misconception of the responsibility of tire manufacturers.

"All of the abuses have tended to increase costs and the whole purpose of the present movement is to eliminate the waste due to these causes.

"Under the plan there is a revision of the old guaranty in the form of a new manufacturer's standard warranty, aimed to clear up misunderstandings the public may have had regarding the manufacturer's responsibility. A standard claim form is also being placed in the hands of dealers.

"The manufacturers are taking steps to put the plan into effect immediately. The new manufacturer's standard warranty and the standard claim form have already been welcomed by the National Tire Dealers' Ass'n as a constructive measure. Through the plan all claims covering alleged defects will be presented in a uniform manner for consideration by the tire manufacturer.

"The form should result in the elimination of 'policy' adjustments, which have been the bane of the tire industry since its inception and have caused losses running into large sums annually. Hereafter manufacturers will consider alleged defective tires only on the basis of general appearance and the condition in which they are returned by the customer.

"No claims will be considered unless the standard claim form is executed by the tire owner. The claim form does not enter into the transaction between the dealer and the consumer at the time of sale, and is only to be used when the tire owner may have occasion to present a claim based on defective workmanship or material."

## C. A. Blake Appointed Winton Superintendent

CLEVELAND, Nov. 14—C. A. Blake, who for some time has been superintendent of the Stearns factory, has been appointed in a similar capacity at the Winton plant.

N. E. Ranny, purchasing agent for Winton, has resigned. His successor has not been named.

The Winton company is making a rearrangement of factory methods, both in the general office and in factory distribution, for the purpose of cutting down overhead and increasing production, thereby lowering the cost per unit.

## SIGNAL DEMURRER DISMISSED

CLEVELAND, Nov. 14—The Court of Common Pleas has refused to sustain a demurrer filed by the American Signal Co., manufacturer of the Simmons signal, in a patent infringement suit brought by the Protex Signal Co. of this city. The demurrer was for the purpose of finding how strong the court considered the Protex claims of unfair competition.

## British Optimism Maintained at Show

### Olympia and White City Sell Cars —Public Expects Lower Prices

LONDON, Nov. 12 (*By Cable to AUTOMOTIVE INDUSTRIES*)—Business optimism was maintained throughout the annual London passenger car show which closed to-day at Olympia and the White City. There were substantial sales of lighter cars and some of the heavier makes. Reports of large car business are too varied for analysis at this time.

There is a feeling on the part of the public that prices must drop and high body prices are a trade barrier at present. The success of the show has been due pre-eminently to the courage of the dealers. Private sales have been fair and there has been a much larger volume of inquiries than in recent months.

The somewhat improved financial situation and prospects of trade betterment have been the chief factors in this result. Money is tight everywhere and, therefore, it is the part of wisdom to exercise caution in accepting as facts reports now in circulation regarding the actual volume of trade at the show. A majority of the exhibitors professed to be satisfied with the business promised rather than the actual sales. The attendance has been 40 per cent better than last year notwithstanding the fact that the weather was cold throughout the week.

The location of the next show now is being discussed. It is generally accepted that the present plan of dividing the show between two buildings cannot be continued, because it has led to much dissatisfaction on the part of the trade.

## Maxwell Increases Output at Its Newcastle Factory

NEWCASTLE, IND., Nov. 14—F. D. Brebner, superintendent of the local Maxwell plant, states that production is to be speeded up to 150 cars a day. This will be an increase of fifty cars daily over the present schedule and will mean the employment of additional men.

The proposed output will necessitate a considerably larger force than the 900 now employed, the number probably being determined upon Brebner's return from Detroit.

## APPERSON BACK TO 1915

KOKOMO, IND., Nov. 11—Apperson Bros. Automobile Co. is operating five days a week on a schedule about equal to that of 1915 or 1916.



# Move to Drop Distributors Spreads

## Trend Is General Among Companies

### Several to Take Action as Soon as Present Contract Expires

NEW YORK, Nov. 15—While little has been said officially about the movement, which is rapidly gaining momentum among automobile manufacturers, for the elimination of distributors, there is a strong general trend in this direction. Several of the larger companies propose to begin this process of elimination when their contracts with distributors expire.

The Willys-Overland Co. was the first to put the sweeping change into effect by supplanting distributors with factory branches. The various divisions of the General Motors Corp. are reticent on the subject but there is reason to believe that it will be the policy of the corporation as a whole gradually to supplant its distributors. These are only examples to show the trend and numerous other companies propose similar action.

#### Dealers Gain

It is contended that with the distributors, or middlemen, out of the field, it will be possible to make a more liberal discount to the dealer, keep in closer contact with the individual dealers and promote more intensive selling efforts. Manufacturers realize that competition in future will be keener than it ever has been in the past and they are clearing the decks for action.

They contend that they must progress in the race for business or fall back, for they cannot stand still. All of them are determined to give better service for they hold that those companies which take best care of their customers will profit most in the long run. Willys-Overland already has taken a step in this direction by making a material increase in the discount given its dealers on parts.

#### Radical Changes in Lines

Another evidence of the realization that better values must be given purchasers if the race for business is to be successful is found in the extraordinarily large number of new models which are being brought out and which are contemplated for display at the New York and Chicago shows. While it is true that a majority of these models show nothing that is revolutionary, the trend in all of them is towards refinements and improvements which will appeal to the ultimate purchaser and give him better value.

Radical changes have been made in a good many lines, however, and more are

in prospect at show time. As a consequence the prospect who visits the shows next year will find more of interest to him than has been the case for several years. It will be decidedly to his advantage to do considerable "shopping."

In several lines, at least, final price adjustments have not been made and there will be further reductions coincident with the shows. There is nothing to indicate that these additional reductions will be made at the expense of quality and it is quite possible that some of the new lines which differ radically from their predecessors may increase their prices slightly to cover the added cost of improvements embodied in the cars, but the general trend will be downward.

#### Shows to Stabilize Prices

There is strong hope in every quarter of the industry that the shows will bring a real stabilization of prices. Dealers in all sections of the country contend that the frequent price changes of recent months have added of late to sales resistance and that business cannot be placed on a solid foundation until there is price stabilization for a considerable period. This feeling is not particularly surprising in view of the fact that several companies have reduced their prices after giving positive assurance that the "final reductions" had been made.

There is a growing belief on the part of manufacturers that general inability of distributors and dealers, because of credit difficulties, to stock cars for the winter as heavily as usual will result in a decline in the volume of production for the next four months at least.

(Continued on page 996)

## Willys Denies Rumors Relating to Bugatti

LONDON, Nov. 14 (By Cable to AUTOMOTIVE INDUSTRIES) — Willys-Overland Crossley, Ltd., has acquired the right to manufacture the Bugatti car in Great Britain. The Bugatti is a small Italian car which formerly was made in Germany but now is built in Alsace. It has enjoyed wide popularity on the Continent and has taken part in numerous contests. Fuel economy is one of the arguments advanced in promoting its sale. The car has been sold in England heretofore, but has not been made in this country.

NEW YORK, Nov. 15—It was stated at the headquarters of the Willys-Overland Co., of which Willys-Overland Crossley is a subsidiary, that nothing had been heard here of any contract to manufacture or sell the Bugatti car in England.

## Takes Big Mortgage on G. M. Building

### S. W. Straus & Co. Purchases \$12,000,000 7 Per Cent Serial Bonds

NEW YORK, Nov. 16—Pierre S. du Pont, president of the General Motors Corp., announced to-day that S. W. Straus & Co. had purchased from the General Motors Building Corp., a subsidiary of General Motors Corp., \$12,000,000 first mortgage 7 per cent serial bonds maturing serially from 1922 to 1946.

These bonds are secured by the corporation's new office building at Detroit. This building, which has just been completed, represents an investment of more than \$20,000,000. It occupies an entire block 300 x 500 feet, is 15 stories tall and is the largest office building in the world. This loan represents one of the largest real estate mortgages ever recorded.

In connection with the underwriting, S. W. Straus & Co. said:

"The General Motors building has been leased for a term of 30 years by the General Motors Corp. at an annual rental fixed at an amount sufficient to pay the combined principal and interest charges on the bonds in each successive year, after the payment of all operating expenses. Under the covenants of the trust mortgage the bonds are to be paid off in yearly serial installments, the coupons being payable twice a year, May 1 and Nov. 1.

"The trust mortgage requires the General Motors Building Corp., subsidiary of the General Motors Corp., to make 300 approximately equal monthly payments to S. W. Straus & Co. of \$85,000 each. These payments automatically provide in advance a fund of a little more than \$1,000,000 a year from which the coupons are cashed, the balance being used for the serial retirement of the bonds.

"The bonds constitute a direct closed first mortgage on the building, land and equipment as well as first lien on the income from the property.

"The General Motors Corp. with some of its subsidiary and affiliated companies has already moved into the building and will shortly occupy substantially 50 per cent of the space and whatever remaining space not immediately required for the occupancy of the company is being sub-leased. Construction on the building was commenced in 1919 and the greater portion of it was completed in April 1921. It is now proposed to complete the partitioning, interior finishing and equipment of the remaining portion at an estimated cost of \$3,300,000.

"The General Motors Corp. states that its decision to complete the interior of the remaining portion of the building at this time is based on the fact that there is every indication of an active demand for the space at satisfactory rentals. It is anticipated that the new construction will be completed by May 1, 1922."

## Goodyear Holds Diamond Patents

### Seiberling Denies Rumors That He Has Rights for Tire Tread

AKRON, Nov. 14—With the sale of the Portage Tire & Rubber Co. of Barcherton, Ohio, to Frank A. Seiberling finally ratified by Referee in Bankruptcy Harry L. Snyder, and needing only a confirming order from Judge C. D. Westenhaver of the Federal Court of Cleveland to permit consummation of the deal, the former Goodyear president is expected to make formal announcement within the next few days as to definite plans for re-entry into the tire manufacturing business.

#### Portage Sale Probable

Unless attorneys for the Portage stockholders' protective committee file a petition of protest against the sale of the plant to Seiberling, with Judge Westenhaver before Nov. 19, the sale will become automatically confirmed by decision of Referee Snyder. And should the petition be filed it is considered doubtful if Judge Westenhaver will permit any further review of the hearing before Snyder, having already remanded the case to Snyder's bankruptcy court for final decision, following the latter's first confirmation of the sale and the subsequent protest of Portage stockholders.

While these negotiations are going on Seiberling is marking time and anxiously awaiting the time when acquisition of the Portage plant will pave the way for his "come back" as the "Little Napoleon of the tire industry."

With acquisition of the Portage plant Seiberling will be able to enter production at the rate of 5,000 tires and 6,000 tubes daily. The Lehigh Tire & Rubber Co. of New Castle, Pa., which he acquired at receiver's sale, has a capacity of 2,000 tires and 400 tubes daily, employing 750. The Portage plant, employing 1,500 men, can be built up to a daily capacity of 3,000 casings and 2,000 tubes.

#### Holds Machinery Patents

Rumors extant in Akron to the effect that Seiberling still held the patent rights on the diamond or famous Goodyear All-Weather tire tread, and had given the Goodyear company a 60-day notice to discontinue the manufacture of that tread, are emphatically denied by Seiberling.

"I did hold the patent rights on the diamond tread but in the reorganization of Goodyear and my own retirement from the presidency of the company, I assigned the patent rights to Goodyear," states Seiberling. "Even if I did now hold them I doubt if I should ever compel Goodyear to quit manufacturing the tread, for my interest lies in promoting Goodyear, not injuring Goodyear, and in helping to continue to protect Goodyear's good name."

Seiberling does, however, hold the patent rights on most of the tire building machinery used by Goodyear and

has given the company shop rights thereto, receiving thereby a royalty on every Goodyear tire made.

Seiberling has development engineers and rubber chemists working upon new tread designs and new tire processes. He announces that he expects to introduce an entire new line of cord and fabric automobile tires and motor truck tires, all of which will constitute a rather radical departure from present tires.

His plans are said to include the organization and financing of a holding corporation, of which he naturally will become the directing head, for the operation of the two rubber companies. That he is still endeavoring to acquire other rubber companies is not denied. The organization of a holding corporation will mean the flotation of a sufficiently large stock issue to permit capitalization and Seiberling announces that when he finally reveals his full plans, the people of Akron and the country in general will have an opportunity to join with him in his new venture.

Seiberling admits that his plans are fully completed and are ready for public announcement as soon as the sale of the Portage company to him is consummated. Portage stockholders, who protested the sale to Seiberling, proposed to refinance and to reorganize the company, buying it in themselves. Seiberling's bid for the Portage plant is admittedly the best offered.

## Selden Business Gained 103 Per Cent in October

ROCHESTER, Nov. 14—Stockholders of the Selden Truck Corp. were informed at their annual meeting that business of the company for October was 103 per cent in excess of September sales. Enough business has been booked for the remainder of the year to assure a healthy increase over 1920.

George C. Gordon was re-elected president of the company. Other officers elected were William C. Barry, Robert H. Salmons, Hal T. Boulden and Wilbur F. Reynolds, vice-presidents; S. P. Gould, secretary and Edwin B. Osborn, treasurer. Charles H. Stearns and Ralph H. Bollard were elected to the directorate, Bollard representing the New York financial interests in the company.

## Halladay Motors Corp. Makes Two New Models

NEWARK, OHIO, Nov. 14—The Halladay Motors Corp., is bringing out two new models, one the Falcon Six and the other the Falcon Light Four. The prices are as follows:

	Six	Light Four
Roadster .....	\$1,595	\$1,295
Touring .....	1,595	1,295
Sedan .....	2,395	2,085
Coupe .....	2,295	1,990
Cabriolet .....	1,795	1,495

The body fittings are brought up to date with the adoption of cylindrical headlamps. The four cylinder model can be fitted with a heavy duty engine with 3½-in. bore instead of 3¼-in. bore at an additional cost of \$200.

## Rail Commission Blames Automobile

### Holds It Responsible for Low Earnings of Pacific Electric of Los Angeles

LOS ANGELES, Nov. 14—The motor car is declared to be chiefly responsible for the low earnings of the Pacific Electric of Los Angeles in a report completed by the engineering division of the State Railroad Commission. This report consisting of two large volumes, was introduced at the hearing of the application of the Pacific Electric to increase rates held here. Had it not been for the financial backing of the Southern Pacific, the parent company, the electric system would probably have gone through a receivership, the report asserts.

#### Travel Increases

Changes in the present rate schedule are called for, if general principles laid down in the engineering survey are approved by the commission, according to the engineering department. As showing the effect of automobile competition, attention is called to the fact that while the traction territory has doubled in population and according to an accepted transportation maxim travel has quadrupled, the electric lines carried fewer passengers in 1920 than in 1914.

The choice whether the railway or the motor bus shall go rests ultimately with the people, the report says, and adds:

"It is the experience, however, not only of California cities, but of practically every community where this choice has had to be made, that the time is not yet here when the street car can be dispensed with and its place taken by the jitney."

On the subject of motor transportation in general the report says:

"It is well known that there is much confusion and great lack of reliability on the subject of motor transportation costs. Our study appears to confirm the opinion held by us heretofore, that under normal conditions and in a great majority of cases, the jitney or motor bus cannot compete with the electric lines and that the real costs of motor transportation are higher than commonly figured and higher than the costs of electric transportation. This in the face of the fact that electric transportation has to sustain a heavy investment in permanent way, while the motor service carries no such burden."

#### INTERLOCKING REORGANIZED

AKRON, Nov. 14—The Interlocking Cord Tire Co., of which the receivership was lifted recently, has been reorganized by stockholders with Edward Kohl as president and has resumed tire production in its Mogadore plant near Akron. Production for the present will be 50 tires daily. The company went into the hands of a receiver with indictment of its former officers for alleged violation of the Ohio blue sky law.



## Spring Shortage of Cars Foreseen

### Many Dealers Are Unable to Finance Stocks for Winter Months

NEW YORK, Nov. 15—Slackening of production, which had been expected in the passenger car field this month, already has become apparent, especially in the medium priced lines. The falling off includes such companies as Ford, Dodge, Buick and Studebaker. While the Ford November schedule calls for 85,000 cars it is flexible and production will be continued on the basis of sales.

While these companies, which have been running at top speed for many weeks, are slowing up, other manufacturers who have not done so well are now benefiting from new models and new prices. Maxwell is conspicuous in this list and its new models have brought many congratulatory comments. Advance reports of the new Chalmers line indicate that it will be on a par with its companion car and that the two together will do much to rehabilitate the Maxwell-Chalmers combination.

Numerous other companies have brought out new models embodying many improvements or contemplate doing so in the near future. As a consequence, with the price concessions which have been made in the past year, purchasers of cars hereafter will get better value for their money than they have for a long time.

There is much interest and speculation both inside the trade and out over the air-cooled line with which the General Motors Corp. is experimenting. There have been many unauthorized and inaccurate reports regarding General Motors plans in this connection. They have been set at rest by the official statement by President duPont that plans for manufacture and sale of these models must be held in abeyance until the experimental development work is finally completed. The cars are being developed under the direction of C. F. Kettering, who has charge of the corporation's engineering work, and it is not proposed to put them on the market until they are satisfactory to their sponsors in every respect.

Much interest has been aroused by the affidavit of M. B. Leahy, general sales manager of the Durant Motor Co. of New York, which stated that a total of 24,817 shipping orders had been received at the close of business Oct. 22. If this pace is maintained Durant will be one of the biggest pro-

ducers in 1922. Deliveries of the "Four" have begun and production will increase steadily. No date has been set for putting the six-cylinder Durant on the market.

Manufacturers' schedules are being curtailed to a greater extent than otherwise would be the case because of their determination to build only for actual sales and dealers generally are not inclined to stock cars heavily for the winter months. This is not due to any skepticism on the part of the dealers as to the future of business but rather to difficult credit conditions. Many dealers, especially in the smaller towns, have found it impossible to finance stocks of cars to carry them over the winter. It is feared that this condition may result in a temporary shortage in cars in some popular lines in the early spring.

## Tire Shipments Show Decline in September

WASHINGTON, Nov. 14—Analysis of business conditions by the Department of Commerce based upon reports of trade associations and other co-operating bodies, shows that domestic shipments of tires and tubes indicated a seasonal decline of from 25 to 30 per cent during September. Stocks of pneumatic tires declined 14.5 per cent and solid tires 25.7 per cent, while inner tube stocks showed an increase of 4.5 per cent. Stocks of each of these products are from 30 to 45 per cent less than the average of the six months, November, 1920, to April, 1921. Production, on the other hand, is from 60 to 200 per cent above the same six months average.

Imports of crude rubber increased 4.4 per cent in September and were 23.9 per cent greater than for the same month of 1920. Consumption of crude rubber by tire manufacturers made the seasonal decline amount to 36.5 per cent in September with tire and tube production dropping correspondingly.

## Three American Firms to Exhibit at Brussels

PARIS, Nov. 6 (*By Mail*)—The Belgian automobile show, the last of the European series, will open in the Palais du Cinquantenaire, Brussels, on Dec. 3 and will close on Dec. 14. The exhibition is international and is open to the entire automotive industry, there being sections open for passenger cars, trucks, motorcycles, tractors, accessories, and bodies.

In the passenger car section France has a majority with 31 exhibitors. Italy is represented by five firms; America will have Studebaker, Case and Overland; England is sending two makes of cars, and the Belgian passenger car makers in the show are Metallurgique, Minerva, Dasse, Imperia-Abadal, Excelsior, F. N., Nagant, Miesse, and Somea. There are 208 exhibitors.

## Dealers Organize in Pennsylvania

### Association Idea Emphasized at Meeting Which Unites 689 Men in Industry

HARRISBURG, PA., Nov. 15—The Pennsylvania Automotive Association was organized here yesterday and to-day with 200 members. It is affiliated with the National Automobile Dealers Association and will include in its membership car and truck distributors and dealers, jobbers, automotive equipment dealers, repairmen and various other classes of people in the automotive trades who will be classed as associate members.

The association was formed with the two-fold purpose of employing co-operation to alleviate trade troubles and mobilizing favorable public opinion for the good of the industry.

The meeting was held in the chamber of the House of Representatives at the State Capitol and was attended by 156 representative men in the trade, mostly dealers, who spoke for local associations in 60 cities and towns, representing 689 members.

### N. A. D. A. in Charge

Details of the organization were conducted by Harry G. Moock, general manager, and P. F. Drury, assistant general manager of the N. A. D. A.

There was no thought expressed that the association would be able to solve the used car problem, or make dealers' relations with manufacturers 100 per cent satisfactory.

The meeting itself developed a valuable exchange of ideas through addresses and an open forum. Speakers included Moock, Drury, Wayne Hearne, who is doing educational work in dealer organization throughout the country, Alfred Reeves, general manager of the National Automobile Chamber of Commerce, Harry Meixell, Jr., secretary of the Motor Vehicle Conference Committee, Neal G. Adair, editor of *Motor World*, and A. V. Cummings of the *Automobile Trade Journal*.

### Wayne Hearne Speaks

Hearne declared that the 1922 dealer will have a keen appreciation of honor, will tend toward becoming an exclusive dealer instead of handling various lines, "because exclusiveness makes for expertness," will control his prospects and assign them to salesmen best fitted to handle them, instead of letting them remain the "property" of individual salesmen, will "quit worrying about a contract and sell merchandise that he has faith in as long as he likes the factory policy and the factory likes his representation."

Of the manufacturers, Hearne said: "You say the factories compel you to trade. Can you call yourselves business men when you let someone else run your business? You ought to run it yourselves or get out."

## Hawkins Outlines Service Methods

### Inefficiency in Selling Plans Are Also Discussed at Mana- gers' Convention

NEW YORK, Nov. 17—Adoption of an efficient and satisfactory service policy as a means of increasing sales was advocated by N. A. Hawkins of the advisory staff of the General Motors Corp. in an address before the Service Managers' Convention at the National Automobile Chamber of Commerce.

Hawkins referred to the car owner as the service manager's "boss," and declared that unless the service department functioned to the satisfaction of that "boss" the department was a failure.

#### Parts Stocking Necessary

A good many things enter into the matter of efficient service, it was pointed out, and the speaker went on to describe methods of meeting some of the obstacles encountered. One important point discussed was the matter of dealers not carrying a complete stock of car parts.

Hawkins advocated the stocking of dealers' shops with sufficient parts so that there would be an elimination of telegraphic orders, parcel post and express deliveries. All these items, of course, must ultimately be borne by the purchaser of the part, and unless the dealer is adequately stocked the cost is materially increased. In this connection it was also shown that by the manufacturer keeping his dealers stocked with parts from the factory, the so-called "pirate parts" would be largely eliminated.

Hawkins declared that the job of keeping old cars running is more important than selling new cars, for the car owner who is satisfied with the service he receives on an old car will, when the time for replacement comes, place an order for a new car of the same make as his old one.

#### Would Zone Cities

Somewhat aside from the question of service, Hawkins touched upon the inefficient selling methods in use in many cities, and offered as a remedy the zoning of cities according to population and territory. It was shown that it was possible in New York to-day to have 40 salesmen selling the same car call on a single prospect the same day. This, he said, was due to the fact that salesmen representing different dealer organizations were not confined to any one district, but were given free play throughout the entire city.

The discussions that followed Hawkins' address centered about several topics, one of the most talked of being the "pirate part" evil. Several service managers were of the opinion that all parts that were not easily distinguishable should be trade-marked. The fact

## FIRST DURANT SIX DRIVEN TO MUNCIE

NEW YORK, Nov. 15—W. R. Willett, president and general manager of the Durant Motor Car Co. of Indiana, will start from this city for Muncie to-morrow in the first Durant six to be turned out and tested at the Long Island City plant of the Durant Motor Car Co. of New York.

Experimental work on the Durant six, which will be scarcely recognizable as the former Sheridan of the General Motors line, has been practically completed and production will begin in the near future at Muncie.

Deliveries of the Durant four to purchasers have been begun from the Long Island City plant.

was brought out that manufacturers buying a certain part might reject material that was submitted to them for the construction of that part.

The parts manufacturer, in turn, would go ahead and construct the articles of that rejected material and sell directly to the dealer upon the representation that the part was the same make as that used in the original car. Naturally, the part could be bought considerably cheaper than it could from the manufacturer. Placing of trade-marks upon such parts, it was pointed out, would eliminate this evil. It was also agreed, in this connection, that there are many parts which can best be serviced by the parts manufacturers, and that there should be little attempt by the dealer to undertake such work.

Parts prices were also thoroughly discussed and most of the delegates were of the opinion that there should be a reduction in those prices, especially since there has been a reduction in car prices. How this should be accomplished, however, was left largely to the individual manufacturer to determine.

There was also a discussion as to whether the list price of each part should be made to include the tax and transportation charges, so that each part could be purchased for the same amount of money throughout the country. Generally, it was agreed that parts prices should be listed f.o.b., although there were strong arguments for the other method.

## A. E. VINTON DIES SUDDENLY

INDIANAPOLIS, Nov. 11—A. E. Vinton, assistant general sales manager of the National Motor Vehicle Corp., died suddenly at his home here although he had been in apparently normal health. Vinton first joined the National organization in 1909 and served continuously with it until 1917, when he became associated with the Mansfield Tire & Rubber Co. He returned to the National as assistant general sales manager in August of this year.

## Tire Production Less in September

### Decline of 600,000 in Stocks on Hand—Pneumatic Ship- ments Decreased

NEW YORK, Nov. 15—A reduction of approximately 1,100,000 in the number of pneumatic tires produced in September as compared with August was reported to the Department of Commerce by the Rubber Association of America in its statistics on production, shipments and inventory. There was a decline of about 600,000 in stocks on hand, but a falling off of 840,000 in shipments of pneumatics. The figures by months since November, 1920, which was taken as the base month, up to October follow:

#### PNEUMATIC CASINGS

1920	Inventory	Production	Shipments
Nov. ....	5,170,928	915,651	1,262,159
Dec. ....	5,508,380	506,111	1,327,153
1921			
Jan. ....	5,319,605	703,430	965,417
Feb. ....	5,193,018	819,892	1,073,756
Mar. ....	4,597,103	1,163,314	1,614,651
Apr. ....	4,527,445	1,651,418	1,785,951
May ....	4,451,668	2,100,917	2,085,882
June ....	4,154,456	2,313,265	2,643,850
July ....	3,892,037	2,570,524	2,757,581
Aug. ....	3,934,583	3,043,187	2,894,442
Sept. ....	3,340,798	1,929,268	2,047,929

#### INNER TUBES

1920	Inventory	Production	Shipments
Nov. ....	5,480,354	1,002,886	1,366,997
Dec. ....	5,786,929	508,446	1,481,285
1921			
Jan. ....	5,586,163	740,824	1,042,617
Feb. ....	5,415,464	916,627	1,129,881
Mar. ....	5,044,861	1,346,483	1,643,690
Apr. ....	4,916,772	1,762,122	1,983,571
May ....	4,751,880	2,210,040	2,342,567
June ....	3,825,098	2,359,928	3,232,673
July ....	3,122,815	3,020,981	3,603,248
Aug. ....	3,649,319	4,430,152	3,804,060
Sept. ....	3,827,830	3,274,822	2,645,758

#### SOLID TIRES

1920	Inventory	Production	Shipments
Nov. ....	294,043	23,299	36,628
Dec. ....	303,473	16,297	40,828
1921			
Jan. ....	303,753	21,220	29,116
Feb. ....	304,274	23,355	29,599
Mar. ....	283,800	28,710	43,926
Apr. ....	269,985	28,859	42,090
May ....	264,633	35,156	40,122
June ....	240,336	28,395	49,867
July ....	220,003	35,123	55,678
Aug. ....	216,367	55,694	66,866
Sept. ....	161,832	37,441	50,276

"Production" and "Shipments" figures cover the entire month for which each report is made. "Inventory" is reported as of the last day of each month.

"Inventory" includes tires and tubes constituting domestic stock in factory and in transit to, or at, warehouses, branches (if any), or in possession of dealers on consignment basis, and as a total represents all tires and tubes still owned by manufacturers as a domestic stock.

"Shipments" include only stock forwarded to a purchaser and does not include stock forwarded to a warehouse, branch, or on a consignment basis, or abroad.

## SPOKE COMPANY SOLD

PINE BLUFF, ARK., Nov. 15—The Pine Bluff Spoke Co. has been sold by C. A. Dunning and associates to Peers & McGlone of Shreveport, La., who will operate the plant on an increased capacity. Last year in nine months the factory turned out more than \$500,000 worth of spokes for automobiles. Buick, Dort and Oakland were among the makes of automobiles supplied.



## S.A.E. and Petroleum Institute Cooperate

Former Will Furnish Several Speakers for Annual Meeting of Latter

NEW YORK, Nov. 15—The second annual meeting of the American Petroleum Institute, to be held at the Congress Hotel, Chicago, Dec. 6, 7 and 8, 1921, will include two sessions in which members of the Society of Automotive Engineers and other men prominent in the automotive industry will take a conspicuous part.

The most important sessions from the automotive standpoint are those to be held on the mornings of Tuesday, Dec. 6, and Wednesday, Dec. 7, and the evening of the latter date. The speakers at the morning sessions referred to will include the following:

### To Discuss Fuel Problems

Quantitative Survey of Petroleum Industry in Respect to Motor Fuel Production by Dr. Van. H. Manning of the A. P. I.; Quantitative Survey of Automotive Engine Fuel Requirements by a representative of the National Automobile Chamber of Commerce; Qualitative Requirements of Motor Vehicle Fuel by Henry M. Crane, representing the S. A. E.; Qualitative Limitations in Marketing and Refining by Frank A. Howard of the Standard Oil Co. of N. J.; Volatility of Motor Fuel as Marketed in the United States by N. A. C. Smith of the U. S. Bureau of Mines; What Constitutes True Volatility, by R. E. Wilson of the Massachusetts Institute of Technology; Limitations Imposed on Economy by Volatility Changes by F. C. Mock and Practical Effects of Too Low Volatility by O. C. Berry. David Beecroft, as President of the S. A. E., will speak briefly on the general subject of research.

At the evening session on Wednesday, Dec. 7, Harry L. Horning will make an address in which he will discuss some of the fuel problems of the automotive industry.

One purpose of the foregoing sessions is to promote a better mutual understanding in relation to fuel problems which concern the fuel producers on the one hand and the producers of equipment which uses the fuel on the other.

### Sessions Open to Public

Other sessions, the subjects of which have not as yet been announced, will be held in the afternoon and evening of the first two days of the meeting and the morning and afternoon of the concluding day. The speakers at these sessions will include the following, most of whom are prominent officers of various companies in the petroleum or closely related industries:

Walter C. Teagle, Thomas A. O'Donnell, Amos L. Beaty, D. W. Moffitt, Edward L. Doheny, Edward Prizer, Frank Haskell, J. D. Collett, Paul Shoup, Louis C. Sands and Edward C. Finney, first assistant secretary, Department of the Interior.

The concluding event of the meeting will be the dinner to be held on the

## INTERESTING SCHOOLS IN SAFETY CAMPAIGN

WASHINGTON, Nov. 15—Posters are being distributed by the Highway and Highway Transport Education Committee announcing prizes to be awarded grammar school children for the best essay on "How Can I Make the Highways More Safe" and the rewards to grammar school children for the best classroom lesson for their grades which teach children safe behavior on the highways.

The contest is endorsed by the United States Bureau of Education for the purpose of conserving and developing useful material for safety education. The prizes are donated by the National Automobile Chamber of Commerce.

The posters also announce the rules of the contest and the books on safety which the committee recommends to contestants.

evening of Dec. 8. The speakers at this dinner will include Robert W. Stewart, Harry F. Sinclair, J. C. Donnell, Henry L. Doherty, A. C. Bedford and Sir John Cadman of London, formerly His Majesty's petroleum executive.

All sessions are open to the public.

## Department of Commerce Issues Output Figures

NEW YORK, Nov. 14—Publication of production figures for the automobile industry, covering both passenger cars and trucks has been begun by the Department of Commerce. The National Automobile Chamber of Commerce supplies the figures for its members and the Department of Commerce obtains the statistics from manufacturers who are not members of the N. A. C. C. The report for the quarter ended Sept. 30 shows a production of 474,188 passenger cars and 37,322 trucks or a total of 511,510.

The figures for the three months follow:

	Passenger Cars	Trucks
July .....	163,998	10,601
August .....	166,393	13,076
September .....	143,797	13,645
Total .....	474,188	37,322

The showing for the third quarter of this year, in comparison with the same period of 1920, is amazing. Production in July, August and September of last year with figures from non-members of the N. A. C. C. missing was approximately 560,000, or only about 50,000 less than this year.

### CHARLES R. LAMBERT DIES

DETROIT, Nov. 12—Charles R. Lambert, president of Clayton & Lambert Mfg. Co., manufacturer of pressed metals and gasoline tools, died this week after an illness of several years.

## Action on Maibohm Awaiting Creditors

Postponement of Reorganization Also Due to Federal Tax Claim

SANDUSKY, OHIO, Nov. 15—The sale of the Maibohm Motors Co., for the purpose of reorganization of the company, has been postponed until Nov. 28 in order to determine priority of a claim for Federal taxes and allow other creditors to align themselves in the matter of the reorganization.

It is asserted by officers of the company that approximately 90 per cent of the claims are now represented by the creditors' committee, which has worked out the plan for reorganization. The plan contemplates the issuance of about \$600,000 of 7 per cent non-cumulative preferred stock to be issued to creditors to the amount of their claims. This stock would have full voting power and elect its own board of directors, thus having full control of the company until it is retired.

Heading the committee of creditors is E. G. Kirby, trust officer of the Commerce Guardian Trust & Savings Bank, Toledo, and serving with him are R. E. Hayslett of the Hydraulic Pressed Steel Co., Cleveland, and N. T. Brotherton of the Brotherton Knoble Advertising Co., Detroit. W. J. Corr, secretary of the company, has been appointed receiver and trustee in bankruptcy by Federal Judge John M. Killits.

The complete reorganization of the sales department of the company is contemplated following the corporate reorganization. Chairman Kirby of the creditors' committee declared that the plant is expected to turn out between 600 and 1000 cars for the year 1921. He said production of 400 cars would enable the company to take care of its overhead expenses and preferred dividends.

The capitalization of the new company has not yet been determined. It will, however, go into business with nearly \$800,000 of assets and no liabilities.

### MOVING WILLYS FOUNDRY

TOLEDO, Nov. 15—The aluminum foundry of the Willys-Overland Co. is being moved to Pontiac, Mich., where it will be housed by the Wilson Foundry & Machine Co., an allied plant. By moving the plant, all related foundry operations will be brought together and considerable space will be saved at the main plant here.

### DURANT PARTS FOR CANADA

TORONTO, Nov. 14—W. C. Durant stated here recently that his contracts with the parts makers call for the establishment of Canadian plants for the making of parts for the Canadian Durant 4 and 6 models. In the connection Continental and Auto-Lite were mentioned.

## Tire Prices Drop to Lowest Levels

**Goodyear, Miller and General  
Reductions Range from 10  
to 30 Per Cent**

AKRON, Nov. 14—Automobile tire prices have gone to the lowest level in the history of the tire industry, with announcement of drastic price reductions, effective Nov. 15, by most of the major tire companies of Akron.

The long expected break in tire prices came Nov. 12 and followed leads taken by the Firestone Tire & Rubber Co. of Akron and Mason Tire & Rubber Co. of Kent, both of which made price revisions Nov. 1. Firestone cut 20 per cent on cord tires, 10 per cent on fabrics and 10 per cent on truck tires. Mason made a blanket cut of 15 per cent.

Goodyear, Miller and General simultaneously announced their new price schedules Saturday. No announcement at the time was forthcoming from the Goodrich company. The cuts range from 10 to 30 per cent.

### Below Pre-War Level

The significance of the new price schedules is the fact that they bring tire prices to below their pre-war levels by nearly 15 per cent. Another outstanding feature is the fact that the larger cuts are made in prices of cord tires, thus cutting almost in two the margin of price difference between cord and fabric tires, and making it possible to buy cord tires within 25 or 30 per cent as cheaply as fabrics.

The Goodyear cuts announced are 30 per cent on the 3½-in. and 4-in. straight-side cord tires, 26 per cent on the 3½-in. clincher cord tires, and 20 per cent on all 4½ and 5-in. cord tires. Cuts on fabric prices range from 10 to 20 per cent. Goodyear makes no announcement of truck tire revisions.

The Miller Rubber Co. cuts cord tire prices from 20 to 30 per cent and makes a 10 per cent cut on fabrics and a cut ranging from 10 to 20 per cent on truck tires. General price cuts are 20 per cent on cords, from 10 to 20 per cent on fabrics, and 10 per cent on truck tires.

### Smaller Size Cut Greatest

"The fact that tires can now be marketed at less than pre-war costs while at the same time the quality of the product has been greatly improved," says the Goodyear statement made in connection with the company's price revisions, "shows that the rubber industry has done its bit toward bringing back normal stabilized business conditions. The result has been obtained by taking advantage of the present abnormally low costs of raw materials and by increased efficiency of manufacture and distribution, and rigid economies of operation.

"Automobile owners will be interested to know that we have been able to bring down the price of the popular cord tires to where they are not much more expensive in first cost than fabric tires. The differential between the two types in fact has been cut

practically in two. The largest reductions have been made in the smaller sizes where the larger volume of use permits the greatest reduction in manufacturing and distributing costs.

"We believe that business is going to right itself and drive ahead just as soon as the cost of living is adjusted to the income of the consuming public, and the rubber industry is not going to be the last to forward that return to normal."

### Goodrich at Low Mark

AKRON, Nov. 15—The B. F. Goodrich Co. has announced drastic tire price reductions effective to-day. The reductions are on practically all sizes of fabrics and cord automobile tires, solid and pneumatic truck tires and inner tubes.

On the popular sized cord tires the price cuts average over 22 per cent. The Goodrich schedules make the following reductions:

Sizes	Old Price	New Price
30 x 3½ cords.....	\$24.50	\$18.00
32 x 3½ .....	32.90	25.50
31 x 4 .....	40.70	29.40
32 x 4 .....	41.85	32.40

The percentages of cuts taper down according to the larger size tires, being from \$65.10 to \$57.60 on the 37 x 5 and from \$61.90 to \$54.75 on the 35 x 5. Fabric cuts are smaller comparatively, the larger cuts being made in cord prices to bring cord tires nearer the fabric tire costs, Goodrich officials say.

As Goodrich led the field with a 20 per cent cut last May, the new cut carries Goodrich prices to their lowest level, based on mileage records.

(Continued on page 997)

## Fusion Is Under Way of Benz and Rumpler

PARIS, Nov. 6 (By Mail)—Negotiations are in hand for a fusion of the two German firms Benz and Rumpler. The Benz company is the biggest exclusively automobile concern in Germany, with passenger car, truck and Diesel engine factories at Mannheim. It employs about 10,000 hands at the present time.

The Rumpler concern was one of the biggest producers of airplanes in Germany during the war, with factories in the suburbs of Berlin and at Augsburg, in Bavaria. This year, Rumpler, who was an automobile engineer before taking up aviation, produced an automobile of revolutionary design which he intended to build in his Berlin factory and also to have built in other factories under license. Benz never has built airplanes, but was prominent in aviation engines during the war.

### EARL ADDS UNIT

DETROIT, Nov. 14—Earl Motors Co., Inc., has taken over the Jackson Metal Products Co. and the plant will be operated in the future as an Earl manufacturing unit. Most of the sheet metal work for the bodies gasoline tanks, radiator shells and enameling work will be done in the new plant. With the addition of this work the Earl car will be about 80 per cent constructed in the Earl factories.

## A. E. A. Continues Its Sales Program

**Motion Pictures at Annual Con-  
vention Visualize Work of  
New Department**

CHICAGO, Nov. 15—The Automotive Equipment Association, in annual convention here this week, recommitted itself to the sales promotion program authorized at the Mackinac Island convention in July. The work of the campaign to date and plans for the future were visualized for 500 manufacturers and jobber members and their sales representatives in an address by Ray W. Sherman, merchandising director, and in a motion picture presentation of the means by which the association is trying to educate the retail trade to "ask 'em to buy" and so broaden the outlet for the products of the industry.

The story of the sales promotion work made a decidedly favorable impression upon both manufacturer and jobber members. It won for the merchandising department assurances of the working support of members which is necessary in the undertaking of organizing the industry itself to carry out the details of the campaign.

### No Large Field Staff

The association has discarded all suggestions for a large field staff or for extensive appeals to the trade by mail in favor of education of the retail trade through the agency of the jobber salesman, with the manufacturer salesman assisting wherever circumstances permit.

The motion picture showed how a typical salesman demonstrated the profit possibilities in automotive equipment merchandising to a typical garageman and converted the garageman to the better merchandising idea. The movie will be used throughout the country, particularly during the automobile show season and at trade association meetings, to further the campaign.

The business exhibit held in connection with the convention profited somewhat in sales by manufacturers to jobbers through the stimulation resulting from presentation of the sales promotion idea. On the whole, however, jobbers bought lightly. The price reduction trend in the equipment field and the ambition of the jobbing houses for quick turnover were responsible.

Howard M. Dine of Dine Dewees Co., Canton, Ohio, jobber, was nominated for president and C. C. Gates of the Gates Rubber Co. of Denver, vice-president.

### BENZ PLANT CLOSED

NEW YORK, Nov. 15—A dispatch from Frankfort on the Main states that the large automobile works of Benz & Co. at Mannheim have been closed because of "terroristic excesses" of the workmen who are stated to have forced their way into the directors' room and threatened the directors and engineers with physical violence.



## Report of Packard Shows Operating Loss

### Reduced Assets of Company Reflect Reduction in Inventories During Year

DETROIT, Nov. 15—Packard Motor Car Co.'s annual report read at the stockholders' meeting showed an operating loss for the year of \$987,366. Of this \$389,347 was chargeable to the factory and \$598,018 to branches. After paying dividends on preferred stock and setting aside reserves for contingencies, the surplus showed a reduction of \$4,833,776. The surplus now totals \$15,923,895. The balance sheet showed cash and readily marketable securities of \$10,323,000 and current liabilities of \$3,807,342.39.

Directors of the company were all re-named at the annual stockholders meeting and the officers were re-elected by the directors.

### Outlook Optimistic

President Alvan Macauley in his annual statement said:

"We have passed through the trying year in excellent financial condition as the balance sheet indicates. Our various products are fully developed and perfected; our distributors have held together remarkably well, and we are in a position to manufacture and sell, we believe, on a basis competitive with the best among modern manufacturers. With the organization in all its branches working splendidly together, and with a unanimous support and cooperation on the part of the directors of this company, the management looks forward to the future with great confidence.

"After setting up as liabilities amounts owing for current purchase and pay rolls, and reserves for unmatured indebtedness including interest on bonds, and taking into account \$9,853,500 of outstanding debenture bonds and a reserve of \$2,500,000 for contingencies, the company's net worth is \$42,598,795.93. After deducting from the company's net worth the preferred stock at par, the common stock is shown to have a book value of \$23.39 a share."

### Assets \$58,759,638

Total assets of the company of \$58,759,638.32, compared with \$62,808,276.76 a year ago, reflect the reduction in inventories during the year as do the current assets of \$36,167,538.57, compared with \$40,116,589.53 on Aug. 31, 1920. Current liabilities of \$3,807,342.39 also show a reduction as against \$12,442,004.57, part of the latter amount having been refunded in the \$10,000,000 of 10-year 8 per cent gold bonds, dated April 15, 1921, of which \$9,853,500 was outstanding at the end of the fiscal year.

Besides inventories, amounting to \$13,714,703.61 at the Detroit factory and \$7,515,741.84 at the branches, current assets include \$4,523,715.75 in cash, against \$4,314,809.89 a year ago, \$5,800,000 in U. S. Certificates of indebtedness and \$178,123.56 in marketable securities, against miscellaneous investments of \$207,535.43 a year ago, accounts receivable \$3,290,993.71 compared with \$4,882,-

189.47 and deferred installment notes and bills receivable \$1,144,260.10 against \$1,352,727.66.

Current liabilities consist of \$2,188,269.72 in accounts payable and pay roll and \$1,619,072.67 accrued interest and liabilities not due. In the previous year current liabilities included \$5,000,000 of bank loans, \$4,087,549.40 in accounts payable and payrolls and \$3,354,455.17 in Federal taxes and miscellaneous liabilities not due.

Touching on economies effected during the year, President Macauley's report says the company was able to reduce productive labor and manufacturing expense 68 per cent from the amount expended for these two items the previous year. The sales outlook for the coming year he describes as encouraging the anticipations of a profitable and increasing business.

## Agent Obtains Damages in Suit Against Hassler

COLUMBIA, S. C., Nov. 14—David C. Shaw of this city was awarded \$15,000 damages in the United States District Court here in a suit brought against Robert H. Hassler, Inc., of Indianapolis. Shaw sued for \$175,000.

The action grew out of an alleged breach of contract regarding the agency for automobile shock absorbers, manufactured by the Hassler company, and covering exclusive distributing rights in the State for a period of not less than five years. Under this contract, Shaw said he accepted and sold one car load of shock absorbers, building up at the same time, a sales force throughout the State. A second car load of shock absorbers arrived, Shaw testified, and he was notified that he was no longer State agent, and the Columbia Compress Co. instructed not to deliver the car to Shaw, refused to turn it over to him.

The defendant concern claimed the right to terminate the contract and also set up the plea that Shaw, by his alleged failure to pay for the car, had in effect canceled the contract.

This is the second time that the suit has been tried, the first hearing having resulted in a mistrial.

## Dealers Purchase Little at Government Auction

ATLANTA, Nov. 14—Automobiles and motor trucks of an original value of perhaps \$200,000 were sold at public auction at Camp Jesup, near Atlanta, all sales being made to the highest bidders regardless of the price. Most of the equipment was reported to be in comparatively poor condition because of the ravages of weather, but considerable of it was still in working order and was sold at ridiculously low prices. Buyers were present from all over the southeast, including a number of dealers, but only a comparatively few sales were made to dealers. The sale included 116 White motor trucks, several Packard trucks and a number of touring cars.

## Gunn Designs Car for Colonial Motors

### New Company Enters Medium Priced Field in Canada—Production in 1922

DETROIT, Nov. 17—Colonial Motors, Ltd., has been incorporated at Windsor, Ont., with a capital of \$1,000,000 for the manufacture of a specialized unit car to be known as the Canadian, which will sell in the medium price field.

The former plant of the Detroit Insulator Co. at Walkerville has been purchased and production will be started soon after Jan. 1. The output for 1922 is expected to range from 2000 to 3000.

The car will be made in the usual body styles and has been designed by Earl G. Gunn, who was formerly a designer with the Premier and Packard among other companies. The car follows conventional lines except for the elimination of a front axle for which a transverse spring construction is substituted. The engine will be six cylinder type. Body and chassis construction are designed primarily to meet Canadian road conditions. Cars built for export trade will follow special designs to meet conditions in the countries to which they are shipped.

George L. McCain is assistant engineer of the company. Officers have not been elected, pending final development of plans. William Lorimer of Windsor, Ont., and L. A. McCalla are representing the prospective directors in the completion of manufacturing plans.

## Allied Motor Commerce Plans Transport School

INDIANAPOLIS, Nov. 8—The ways and means committee of the recently organized Allied Motor Commerce, Inc., has decided to found a national motor transport school at Indianapolis for the training of executives for motor transport organizations and also plans to establish an extensive data collection and information bureau on all phases of motor transport, availing itself for this purpose of the new motor transport terminal soon to be erected by the Indiana Highway Transport and Terminal Association.

The bureau will also concern itself with highway questions and promotions and make it part of its work to show the public that advancement along this line for truck use interests every taxpayer as well as the transport men and companies directly affected by the roads.

The chairman of the committee is Joseph P. Hayes of the Heating and Plumbing Contractors Association.

### CURTISS ENLARGES FIELD

MONMOUTH, ILL., Nov. 14—The Curtiss-Iowa Aircraft Corp. has been authorized to do business in Illinois and of its \$250,000 capital stock \$36,850 is to be devoted to business in Illinois.

## Lincoln Inventory Halts Production

### Issuance of Receiver's Certificate Probably Not Necessary to Continue Business

DETROIT, Nov. 16—Inventories are still in progress at the plant of the Lincoln Motor Co. and probably will not be finished before the end of the week. Until this task is completed no more cars will be built and no operating schedules will be determined upon. Sales demand will be met from the reserve of cars on hand when the receiver took charge.

H. L. Stanton, vice-president of the Detroit Trust Co., has taken over the active executive work of directing the company. He is being assisted by President H. M. Leland and Vice-President W. C. Leland, acting in advisory capacities. Stanton is the corporation officer of the trust company and has acted as receiver in several reorganizations of automotive companies. He thinks it unlikely that the services of an automobile executive will be sought.

#### Creditors Co-operating

The receiver has not determined how much money will be available to continue the business, but President Ralph Stone of the Detroit Trust Co. thinks it likely there will be enough without the issuance of receivers' certificates. In this connection he declares that the creditors are co-operating to the fullest extent in helping place Lincoln on a sound business footing.

Completion of cars now in process will give the company an additional margin to work upon and a fair number of sales are expected in November, although not the 200 hoped for at the beginning of the month. Orders are reported coming in steadily, distributors finding the demand well up to seasonal standards and in some districts exceeding it.

The receiver states that sales policies of the Lincoln company will be continued, at least for the present. This will mean operating on a sales basis with the possibility of a sales campaign being launched later. A telegram was sent to all distributors to-day by the receiver promising active co-operation at the earliest possible moment and declaring the company was prepared to fill all orders for cars as well as to meet all service demands.

#### Company Ready to Resume

A definite statement of assets and liabilities is now being prepared. Until it is available definite plans cannot be announced for the operation of the plant. Only minor changes have been made in the organization. The office force is being reduced but otherwise the company is staffed to resume operations. Creditors are being asked to forward statements of their accounts for comparison with the company's records.

Through an error, it was stated in AUTOMOTIVE INDUSTRIES last week that

the Lincoln company has filed a voluntary petition in bankruptcy. The court action involved only the appointment of a receiver upon petition of a creditor asking for a receivership for the protection of assets and continuance of the business pending reorganization.

No announcement has been made concerning reorganization plans but it is understood the Lelands lost control of the company when mortgage bonds were issued last July.

NEW YORK, Nov. 16—Formation of a stockholders' protective committee for holders of the Class "A" issue of stock of the Lincoln Motor Co. is announced here. Frank W. Blair & Co. was appointed chairman and the other members chosen were Robert K. Cassatt, Joseph A. Bauer, George S. Franklin, George F. Fuller and G. Herman Kinnicutt.

The committee requested holders of the issue to deposit at once stock certificates with the Central Trust Co. of New York, the Union Trust Co. of Detroit, or the Commercial Trust Co. of Philadelphia. Temporary receipts will be issued by the depositaries in exchange for the stock certificates deposited.

The Class "A" stock, \$50 par, comprises most of the outstanding issues, totaling \$8,000,000, while the Class "B," of no par value, has 160,000 shares outstanding.

## War Supplies Reimported Pending Senate Action

WASHINGTON, Nov. 16—Every effort is being made to expedite the passage of the so-called Graham resolution which would impose a tax of 90 per cent on automobiles, trucks and other war supplies reimported to this country. The bill is on the Senate calendar and will be considered after the conference report on internal revenue revision is adopted.

The bill as passed by the House was favorably reported by the Senate Finance Committee in August, but on objection of one or two senators it was not adopted at that time.

Reports have been received this week, however, showing that quantities of surplus war material have been shipped to this country, as importers or distributing agencies here are taking advantage of the legislative delay.

## Auto Body Co. to Start Durant Body Work Dec. 1

LANSING, Nov. 16—The Auto Body Co. has doubled its working force and will gradually increase the number throughout the winter as the new models of Durant and Earl cars get into production.

A regular schedule on Durant bodies will start Dec. 1. Production already has begun on the Earl touring bodies, and the present schedule will be maintained throughout November and December, when it will be increased.

## Truck Tax Basis Is Same As Candy

### Old Scale Retained in Conferees' Agreement on New Revenue Bill

WASHINGTON, Nov. 16—The Senate and House conferees on the tax revision bill have agreed on the manufacturers' excise tax which shall apply to motor vehicles and automotive equipment. No change has been made in the old scale, which is as follows:

Automobile trucks and automobile wagons, including parts and accessories, 3 per cent.

Other automobiles and motorcycles, including parts and accessories, 5 per cent.

Tires, inner tubes, parts or accessories for motor vehicles sold to any person other than a manufacturer or producer of motor vehicles, 5 per cent.

In addition to motor vehicles, this stigma taxation will apply, under the agreement of the conferees, only to yachts and motor boats costing more than \$100, cameras, candy, firearms, hunting and bowie knives, daggers, sword canes, metallic knuckles, cigar and cigarette holders, automatic slot device vending machines, servants' liveries, hunting and shooting garments, works of art and a few other luxuries which cost more than a stated amount.

An agreement has been reached for a repeal of the taxes which had been in force on furs, musical instruments, sporting goods, moving picture films, chewing gum and electric fans.

As a result of the decision of the conferees, motor trucks which are expected to save the country from disaster in the event of a railroad strike, are taxed on the same basis as candy. Passenger cars, which President Harding has stated are an indispensable part of the life of the country, are taxed on the same basis as works of art and automatic vending machines.

## To Offer Cotta for Sale Dec. 15 as Going Concern

ROCKFORD, ILL., Nov. 14—The Cotta Transmission Co., which has been operated by trustees since its bankruptcy last spring, will be offered for sale Dec. 15 as a "going concern." Frank Wean, referee in bankruptcy, has approved the creditors' plan for disposal of the plant and Rockford financiers are attempting to raise funds to buy in the plant to prevent its removal from this city or its operation by other than local capital.

Thirty-one creditors with claims of \$233,042 favored the plan approved by the referee; 23 with claims of \$165,440 voted to continue the present operation with no fixed plan of its termination. If bids opened next month are not adequate, it is likely the company will continue operation as in the past until favorable offer is secured.



## Stocks Sufficient in Peru This Year

Need for Cars, Trucks and Tractors Will Be Felt in 1922

LIMA, PERU, Oct. 27 (By Mail)—For the rest of 1921 there is perhaps sufficient stock of automobiles, trucks and tractors here to supply the needs without importations but this will change as the year turns. Parts, accessories and tires will have to be imported even before 1922. The summer begins in Peru in the middle of December and about this time automobiles are in greater demand.

After the summer has passed the next stimulus for the automobile trade will come from the increased buying that always precedes the national holidays that are celebrated for several days in the latter part of July. In the latter half of 1922, the automobile business ought to be in full swing again in Peru.

### Cotton Prices Help

Favorable factors that lend to this view are the increasing strength of the Government and the rising price of cotton, with corresponding response by the exchange. Sugar, wool and other products are expected to accompany cotton in its rise.

There is an incipient movement in favor of good roads, which it is hoped will increase, for it will contribute not merely to the larger sale of automobiles, but to the greater and more rapid development of the country.

The latest increase in the use of automotive equipment in Peru has been in the direction of the truck, rather than either tractor or automobile. In the light truck the Americans appear to be having the advantage, while in the heavy trucks perhaps the Europeans are making the most sales.

The total of firms in the capital that are now or have been recently direct importers of automotive equipment is over fifty. Some have temporarily retired from the business but they may return or their places may be taken by newcomers. This number takes no account of the firms in provinces which are importing direct, and whose number will constantly increase.

The Peruvian statistics show the ports of entry of the automobiles imported, and for 1919, the last year for which data is available, the value of the automobiles that went direct to the provinces without touching Lima, amounted to almost 25 per cent of the total value of the automobiles imported. The growth of automobiles used in the provinces is the first thing to be watched in the future development in Peru.

The number of garages in Lima is also more than fifty. These garages are not strong enough to do direct importing, but they furnish centers for propaganda work. They house each from 7 to 75 automobiles. It may be assumed

there are 25 garages in the provinces.

There are six vulcanizing shops, or tire repair shops in Lima, and as many in the provinces. There are six street gasoline pumps in the capital, and eight, possibly more, small stores where gasoline, oil, grease, accessories, and in some cases, tires are sold.

## BULLETINS

NEW YORK, Nov. 17.—The Seiberling Rubber Co. with a capital of \$55,000,000 has been chartered in Delaware. The principal figure in the company will be F. A. Seiberling, former president of the Goodyear Tire & Rubber Co., who is now building up a chain of small tire plants. The Delaware company will act as a holding corporation for these various enterprises.

DETROIT, Nov. 17.—Announcement is made by the Paige-Detroit Motor Car Co. that Paige dealers will be able to offer a car in the light car field early in 1922. It is stated that plans are so far advanced that the new car can be shown at the New York and Chicago shows although no information has been made public as to specifications or price.

LANSING, Nov. 17.—Quantity production will be started at the Lansing plant of the Durant Motor Co. of Michigan on Dec. 20. It is proposed to turn out 4000 cars by March 1. The work of equipping the plant is being hurried to have everything in readiness by Dec. 20.

### UTAH SUBMITS NEW PLAN

SALT LAKE CITY, Nov. 15—Bonding company representatives, in accordance with an agreement reached several months ago, have submitted to the commissioner of insurance a new form of policy which, although it is not so broad in its scope as the one which was declared unlawful and non-enforceable by the attorney-general, will still protect innocent parties holding title in a car that may be confiscated through its driver's illegal operations in the liquor traffic.

### DUESENBERG PRODUCING

NEW YORK, Nov. 14—Duesenberg Automobile & Motors Co., Inc., Indianapolis, Ind., is now in production and delivering cars. It will exhibit at the New York Automobile Salon, to be held at the Commodore Hotel from Nov. 27 to Dec. 3, at which time it expects to appoint its distributor for the Metropolitan district.

### INDORSE SHEPPARD BILL

CHICAGO, Nov. 15—United States Senator Sheppard's bill to encourage highway motor transportation was indorsed at a meeting here of the executive committee of the Shippers' Warehousing and Distributing Association, comprising traffic representatives of some of the leading manufacturing companies of the country.

## Sees Enclosed Cars as French Favorite

Prediction Also Made That Great Market Will Be for Small Makes

NEW YORK CITY, Nov. 15—Henri Depasse, Studebaker representative for France and the French colonies in northern Africa, has arrived in New York with the shipment of \$1,500,000 worth of parts of American motor trucks secured from the American Expeditionary Force camp at Langres, which he will try to sell in this country. Depasse has represented American cars since 1907, when he was Ford representative, up to the present. He considers the sedan or other enclosed types the car of the future in France notwithstanding the favor with which the open type has been held for so many years.

The greatest movement in the automobile industry in France is the development of the small car which was pioneered by Citroen immediately after the armistice. At that time the older French companies openly manifested great opposition to the Citroen organization. Today Citroen is recognized and is in a class by himself in this field.

Recently eleven different French concerns have entered the small car field, and practically all of these makers are unknown in the French manufacturing field. Some of them are stable, well-financed organizations and should prove permanent factors in the industry, while others are not. With gasoline selling at a high price there are many automobiles in France not in use because of the fuel cost.

DePasse believes there is a great market in France for the small car as France to-day has relatively few automobiles in ratio to her population. The low-priced automobile is selling to the farming community and its field is broadening proportionately. To-day the three factors working against the sale of American automobiles in France are exchange, import duty and the price of gasoline.

## N. A. C. C. Seeks Dealer Suggestions for Shows

NEW YORK, Nov. 10—Considerable attention was given by the directors of the National Automobile Chamber of Commerce at their last meeting to the big shows this year, and it was made plain by them that they would welcome suggestions by dealers as to how the above shows could be made more helpful in promoting the sale of cars and assisting dealers.

The N. A. C. C. is seeking a keynote for the advertising which will be used in connection with the expositions this year. The suggestion has been made that it might be advisable to arrange dinners for the dealers who attend the New York and Chicago shows, but there is a feeling that this would do little to advance the sale of cars.

## Economy Considered In Purchase of Car

Survey Is Made by Dealers Association Among 100 Representative Owners

ST. LOUIS, Nov. 15—Manufacturers could expand the medium priced motor car buying field by impressing upon the prospect that it does not "cost a small fortune to keep that kind of a car," according to the analysis by the National Automobile Dealers Association of a number of inquiries recently sent to buyers. Economy was a prevailing consideration in the purchase of the car. Inquiries were sent to 100 car owners who were divided into ten purchasers from each of ten dealers.

The inquiries as sent out by General Manager Harry Mook of the N. A. D. A. developed some rather interesting things that the dealers could do also to sell more motor vehicles. A number suggested that cars were too much misrepresented by salesmen. Then, the sales manager and the salesmen should agree on what representations are to be made by the salesmen. Some sales were lost because the salesman's story was out of line with the house policy.

Some dealers are still too independent, this questionnaire reveals. Courtesy to the customer was stressed by all the buyers as being much needed among the salesmen in the trade. The salesman should get the prospect behind the wheel.

### Price Cut Not Considered

Some of the salient facts developed by the questionnaire were that 20 per cent of the cars purchased were enclosed models. The purchaser disposed of a used car that on the average was 28 months old which he had driven on an average of 19 months for 17,159 miles.

In purchasing a car the reputation of the dealer influenced 50 per cent in the purchase. In two-thirds of the cases the reputation of the manufacturer was an influence.

Comfort and convenience was a consideration among 75 per cent, possession of the same make of car by friends a consideration in 40 per cent, personal friendship with the dealer or salesman a factor with 20 per cent, and trade-in allowance on a used car with 35 per cent.

A rather unexpected angle to the price situation was brought out in the answer to the following question, "Motor car prices are lower now than for many months. Did price reductions help you to decide to buy now?" Seventy-five per cent said price reductions had nothing to do with it.

### SALEM RUBBER FORMED

SALEM, OHIO, Nov. 14—Salem Rubber Co. has been organized with a capital stock of \$250,000 to operate the plant of the Porter Rubber Co. in this city in the manufacture of cord and fabric tires. E. A. Tinman, Willoughby, formerly of

the Portage Rubber Co., Akron, is president. W. H. Sabol, Niles, president of the Niles Rubber Co., has been elected vice-president J. Schwab, Philadelphia, president of the Philadelphia Motor Tire Co., treasurer, and Grant Hill, Salem, general manager of the Porter Rubber Co., secretary. New machinery will be installed for a daily production of 250 tires.

## More Manufacturers to Drop Distributors

(Continued from page 987)

The feeling is becoming apparent that so far as passenger cars are concerned, sales for 1922 will not exceed those of 1921, which has been a much better year than had been expected. Some car makers believe that there may be a temporary shortage of cars in the spring because of the refusal of dealers to stock heavily and the determination of manufacturers to build only enough cars to meet immediate needs. There will be few manufacturers who will store cars in warehouses this winter.

Passenger car manufacturers have no illusions about the difficult position of the dealers. They do not expect bankers to look with favor upon the stocking of automobiles very far beyond immediate requirements. Many dealers are going out of business, and some distributors who have not shown a profit for the past year expect to discontinue their lines. As a consequence there probably will be reduced selling representation during the next year, not only in numbers but in quality, and this is one of the problems which the industry is facing. The result will be competition for the dealers who remain in the field and the education of new men.

These conditions probably will bring about an attitude of greater independence on the part of dealers who remain in business because they realize that they will have little difficulty in obtaining satisfactory lines. Most of them hope that manufacturers will curtail production for the next few months so that there will be a temporary shortage in the spring. They believe that this would do much to clean up the surplus of used cars now on the market. They blame over-production by manufacturers for much of this trouble. Much of their money is tied up in used cars.

### SEEKS LA CHANCE'S REMOVAL

NEW YORK, Nov. 15—Mrs. Robert B. Honeyman, Jr., daughter of the late John K. Stewart, founder of the Stewart Mfg. Co. and the Stewart-Warner Speedometer Corp. of Chicago, has asked the Surrogate Court to remove her uncle, Leander H. LaChance of Chicago, as administrator of her father's estate. She alleges that her uncle and Martin Taylor, a New York attorney, have mismanaged the estate to their own advantage and that her uncle has caused himself to be elected president of the two companies founded by her father. Her allegations are flatly denied by LaChance.

## Road Act Is Help To Every Industry

Completion of New Highways Will  
Tend to Increase Automobile Sales

WASHINGTON, Nov. 15—Enactment of the Federal Highway Act will be of great economic benefit to all lines of industry, according to opinions expressed in Government circles. The President's conference on unemployment made public a statement showing that 6262 miles of new roads will be built, giving employment to more than 150,000 workers in 30 States. The completion of these roads will naturally have a tendency to increase automobile sales in the territories where sales have been restricted by inadequate highway facilities.

What the new appropriation will mean to the country can be judged by the use of the \$275,000,000 previously appropriated, according to the Department of Agriculture. Practically \$200,000,000 of that money has been put to work in projects which are either entirely completed or now under construction. The exact amount was \$199,823,427 on Oct. 31. To match this amount the States have appropriated \$265,529,090.

### Apportionment Little Changed

It is estimated by the Bureau of Public Roads that the Federal aid roads under construction on Oct. 31 were giving employment to about 250,000 men, either directly on the actual road construction or indirectly in the production and transportation of materials used.

Apportionment of the fund to the States is almost the same as in the previous act, the fund being divided into three parts, one part apportioned according to population, one according to area and the third according to mileage of rural and star mail routes. A new feature is the stipulation that no State shall receive less than one-half of one per cent of the total fund which, in this case, amounts to \$365,625. This stipulation will increase the amount received by four of the smaller States, i.e., Delaware, New Hampshire, Rhode Island and Vermont.

## Ford Shipments Totaled 87,947 During October

DETROIT, Nov. 15—Revised figures on total Ford shipments for October give a total of 87,947, closely approaching the 90,000 schedule set for the month. Early November shipments are continuing high and business is expected to approximate closely the October total.

Foreign trade conditions continue to show improvement. The Manchester, England, plant is turning out over 100 cars and trucks daily. The Copenhagen plant is building approximately 700 cars monthly. Shipments of 2100 cars and trucks were made to the Buenos Aires plant in September and 1650 in October.



## Tire Prices Drop To Lowest Levels

United States, Syracuse and Keystone Follow Action of Other Companies

(Continued from page 992)

NEW YORK, Nov. 14—A reduction in prices on its full line of tires, including cords and fabrics for passenger cars and solid and pneumatic tires for trucks, has been announced by the United States Rubber Co. The reduction cannot be calculated on a percentage basis because the prices vary according to type.

The 30 x 3½ fabric casing has been reduced to \$10.90 from \$15.75. This heavy cut is said to bring the price of this size lower than it ever has been made by any one of the "big four." It is stated that the announcement of the reduction is made at this time to aid dealers in making their plans for 1922. The new prices, which became effective Nov. 11, will extend to tire purchasers throughout the country.

### Syra Cords Lower

SYRACUSE, Nov. 15—Syracuse Rubber Co., Inc., manufacturer of Syrac Cord tires, has announced, effective today, a 20 per cent reduction on its cord casings; 20 per cent on its fabric 30 x 3½ special five ply; and 10 per cent on its cord truck casings, fabric regular casings and cord tubes. The reductions are from the price list of Sept. 1, 1921. The company has added a 30 x 3 fabric tire to its line.

### Keystone Meets Goodyear

NEW YORK, Nov. 15—Reductions which bring prices of its product identical with those of the Goodyear Tire & Rubber Co. have been made by the Keystone Tire & Rubber Co., effective immediately.

### NEW TIRE FOR GOODRICH

AKRON, Nov. 17—While official confirmation is lacking, it is understood that the B. F. Goodrich Rubber Co. soon will bring out a new low priced tire to be called the "Black Diamond." It is reported that the price for the 30 x 3½ size will be about \$10.60.

### SIGNAL TRUCK REDUCED

DETROIT, Nov. 16—M. B. Hoagland, representing the reorganized Signal Motor Truck Co., announces price reductions on the Signal line ranging from \$400 to \$900. The prices follow:

	Old Price	New Price
1 ton.....	\$2,475	\$1,950
1½ ton.....	2,925	2,450
2½ ton.....	3,275	2,875
3½ ton.....	4,275	3,675
5 ton.....	5,300	4,400

It is stated that the company will make no change in the construction of the trucks. Incorporation papers will soon be filed at Lansing after which officers and directors will be elected.

## ACCESSORIES BOUGHT WITH FARM PRODUCTS

ATLANTA, Nov. 15—A co-operative crop marketing plan to assist Georgia farmers in disposing of this year's crops was launched by the Atlanta branch of the Ford Motor Co. at a meeting of the district salesmen.

Under this plan authorized Ford dealers throughout the State will either purchase diversified products from the farmers direct, or sponsor the organization of buying groups for this purpose in their respective communities, with the co-operation of the State Bureau of Markets.

In addition to this plan, all dealers have been authorized to accept as payment for automobile parts and accessories at current market prices, any diversified farm products.

## Burke Sells Sheridan Holdings to Durant

MUNCIE, IND., Nov. 17—D. A. Burke, who purchased the Sheridan Motor Car Co. from the General Motors Corp. with W. C. Durant and associates a few months ago, has sold the major portion of his holdings to the Durant Motor Co. of Indiana. He will continue, however, to be a stockholder in the Indiana company and also in Durant Motors, Inc. There will be no severance of his relations with Durant and it is understood that he soon will accept a high position in the parent Durant organization in New York. The Sheridan car was designed by Burke when Durant was president of General Motors.

### ASKS MICHIGAN APPROVAL

NEW YORK, Nov. 17—The Durant Motor Co. of Michigan has applied to the Michigan Securities Commission for approval of its \$5,000,000 capital stock. Of the total capitalization it is reported that W. C. Durant held \$1,300,000 and the other directors \$1,000 each. The assets of the company are listed at \$1,499,258.

### PATERSON POLICIES UNCHANGED

FLINT, MICH., Nov. 15—Announcement is made by W. S. Paterson, president of the W. A. Paterson Co., maker of the Paterson car, that the recent death of W. A. Paterson will in no way alter the policies of this company.

### AUSTIN FINANCED

LONDON, Nov. 4 (By Mail)—It is a satisfactory sign of the upward trend of the automobile trade here that this week the court has approved a settlement of the affairs of the Harper Bean Car Co. It is also stated that a financier has been found to take up £200,000 10 per cent debentures in the Austin Co.

## METAL MARKETS

WHILE the pig iron and steel markets present a rather uninteresting appearance the aluminum situation shows developments of importance to the automotive industries. The sole domestic producer of aluminum, never given to the blowing of trumpets in matters affecting sales policy, has apparently determined to meet all foreign contestants for desirable business and obviously will not permit price to stand in the way of a continuance of relations with those automotive consumers whose aluminum requirements are quantitatively or qualitatively important.

Amid the conditions that prevail in the aluminum market as the result of cheap offerings of foreign metal, made possible by the continuing abnormality of exchange, and postponement of tariff legislation, expediency dictates the course pursued by the domestic producer which apparently consists of judging each inquiry and order upon its individual desirability and determining price on that basis as a means of maintaining the home market. Stocks of foreign aluminum ingots in the United States are roughly estimated at 10,000 tons.

Certain it is, however, that the tonnage of foreign aluminum now in this country will continue to act as a depressing market factor over many months to come, unless artificial measures are resorted to so as to take most of this metal off the market. Rumor has it that Detroit banking interests took 2000 tons of foreign ingots at 15c. a lb. and are holding the metal for the accommodation of a group of consumers who will draw from this warehouse stock whatever tonnages their operating schedules call for and who are thus relieved of the financial burden of carrying this stock on their own account.

The British aluminum interests are not taking any part in the price slashing contest. They have built up a certain steady trade in the United States and are more concerned about conserving this than about quick liquidation or accumulations. The Swiss and Norwegian producers also refuse to meet the prices named by some of the German and French interests. Amid this international skirmish for American dollars in exchange for foreign aluminum the American producer is no longer permitting grass to grow under his feet, but has seemingly taken what may be characterized as the aggressive defensive when it comes to worthwhile business.

Pig Iron.—The market rules quiet with little probability of inclusive changes in its tone over the remainder of the year.

Steel.—No change in conditions is visible. All automotive steels are nominally unchanged in price and the movement continues to be chiefly a hand-to-mouth affair. In sheet prices there continue to be sellers who are ready to make concessions.

Aluminum.—The market for aluminum sheets has turned more active. Foreign sellers name slightly higher asking prices, undoubtedly in response to cables advising stronger sheet markets abroad. Swiss interests are reported to have received an order for 100,000 lbs. of flat sheets at a price supposed to be below 30c.

Copper.—Brass mills are reported to be buying more freely as the result of augmented operations which have now reached one-half to two-thirds of capacity. Most consumers refuse to pay more than 13c. and, if producers will not sell at that level, prefer to await further developments.

## INDUSTRIAL NOTES

**American Tractor & Harvester Co.,** Stuttgart, Ark., has perfected a transmission for transmitting power from the motor of Fordson and other tractors to operate the mechanism of binders and other harvesters. The device consists of five cog wheels with appropriate housing to attach to the rear of a tractor, with a telescoping shaft extending to the binder. The device transmits power to the binder while making short turns, crossing levees, etc. The device is used in the Arkansas rice fields.

**Speedway Engineering Co.,** which has been engaged in the manufacture of valve head, parts and accessories for automobiles, has been incorporated for \$100,000. Plans have been made for expansion and the moving of the concern to larger quarters where production on an increased scale will be undertaken. The directors consist of Rufus E. Welborn, Herbert C. Welborn and Wilbert C. Hunt. The company succeeds the Craig-Hunt Co., which met financial difficulties.

**International Motor Co.** reports that deliveries of its trucks to customers for the first nine months of 1921 were at the rate of 70 per cent of its best previous year. Orders for October were better than for any month since May, and November thus far is as good as October. The company had expected in the third quarter to recover probably two-thirds of its losses for July and August, but the three months showed an actual operating profit in excess of \$12,000.

**International Wheel & Rim Co. of Canada, Ltd.,** has been incorporated under Dominion of Canada charter with Joseph M. Crenan as president and general manager, with temporary headquarters at Toronto. Arrangements have been made that insure production within sixty days of Culp-Crenan steel disc wheels and Culp demountable rims. Associated with Crenan is a syndicate of Toronto and Hamilton capitalists.

**Horrocks Rubber Co.,** incorporated for \$50,000, has been organized by Arthur C. Horrocks, formerly education director at the head of the Goodyear Industrial University in Akron. Horrocks has leased the plant of the Denmead Tire Co., in East Akron, and has started on production of tubes and tire accessories.

**Pre-Selex Gear Shift Corp.** has opened a Detroit office in charge of Franklin A. Miller, vice-president. All sales and advertising work will be handled from this office. The new gear shift is being studied by engineers in a number of leading factories in the Detroit district.

**Kendell Engineering Co.,** Fort Wayne, has been organized by C. A. and R. L. Kendell, formerly connected with the Chopla Piston Ring Co. of Detroit and Auburn, Ind., to manufacture piston rings.

**Steam & Gas Auto Co.,** Birmingham, has changed its name to the McCormack Brothers Motor Car Co., Inc., and has increased its capital stock to \$50,000.

## Gary Truck Acquires Chase Tractor Assets

TORONTO, Nov. 14—Chase Tractors Corp., which has a modern plant in this city, has sold its assets to the Canadian Gary Truck Co., a subsidiary of the Gary Truck Co. of Indiana. The consideration is said to be in the neighborhood of \$1,400,000 although the payment is not all in cash.

The Canadian Gary company will have an authorized capital of \$4,500,000, of which \$500,000 preferred is soon to be offered. The price of the property is given as \$750,000. It is proposed to exchange securities with present shareholders of Chase Tractors on a basis of one share of Canadian Gary, pfd., and a bonus of 50 per cent of common for each share of Chase, pfd.

It is expected that the new corporation will manufacture Chase tractors as well as Gary trucks.

## Underwriters Adopt Limited Endorsements

NEW YORK, Nov. 15—The Western Automobile Underwriters' Conference has voted to put into effect to-day a limited coverage endorsement and a theft limitation endorsement for Cleveland and Cuyahoga County, Ohio. These endorsements are made mandatory, one or the other but not both, and the rates are reduced 20 per cent for such limitation. They provide that the company shall not be liable for an amount greater than 80 per cent of any actual loss or damage sustained.

The Western conference also has adopted a form of limited theft cover to be applied in Chicago and Cook County, Ill. This is to be effective to-day, and is in the form of an endorsement limiting the percentage of liability for loss from 75 to 95 per cent, according to list prices of cars insured. For the use of the limited cover a credit of 50 per cent of the theft rate is to be allowed on classes of cars where the 75 to 85 per cent limit is to be used.

## Non-Competitors Form Body for Foreign Trade

LANSING, Nov. 14—Associated Machinery Corp. has been formed by Novo Engine Co., this city, Pawling & Harnischfeger Co. and Chain Belt Co., Milwaukee, and the Insley Mfg. Co., Indianapolis, for the purpose of promoting foreign trade.

Each of the companies produces non-competing products and by handling them in conjunction with each other economies are made possible. Equal shares in the stock of the company are held by each member. The officers are Henry Harnischfeger, president; Clarence E. Bement, vice-president, and Clifford F. Messenger, secretary and treasurer. Lionel R. Vinall-Moon is managing director in India and Charles L. Langlotz manager of the New York office.

## STOUGHTON PLANT BURNS

STOUGHTON, WIS., Nov. 16—Twenty complete trucks and the truck plant of the Stoughton Wagon Co. were destroyed yesterday by a fire which for a time threatened a part of the town. The damage is estimated at nearly \$400,000. The fire is believed to have started when one of the workmen passed too close to a tank of gasoline with a lighted acetylene torch.

## BANK CREDITS

*Written exclusively for AUTOMOTIVE INDUSTRIES by the Guaranty Trust Co., second largest bank in America.*

Although the general trend of the money market for the last few weeks has been downward, during the past week, in which there were two holidays, call money, ranging from 5 per cent to 6 per cent as against 4½ per cent to 6 per cent in the previous week, was higher than was expected in some quarters.

Sixty and ninety-day maturities were quoted at 5 per cent to 5¼ per cent; four and five months' maturities at 5¼ per cent, and six months' maturities at 5¼ per cent to 5½ per cent as against 5 per cent for sixty-day paper, and a range of 5¼ per cent to 5½ per cent for the longer maturities up to six months in the previous week. Prime commercial paper remained unchanged at 5 per cent to 5¼ per cent.

The New York Reserve showed a decrease of \$34,691,000 in total reserves, which was largely accounted for by a reduction of \$34,571,000 in total gold reserves. Total earning assets increased \$65,964,000. The ratio of total reserves to deposit and Federal Reserve note liabilities combined decreased from 83.1 per cent to 79.9 per cent, while the ratio of gold reserves to Federal Reserve notes in circulation, after setting aside 35 per cent against deposit liabilities, decreased from 136 per cent to 128.1 per cent.

An important announcement of the past week was that made in the British Parliament that Great Britain is about to resume interest payments on its debt to the United States Treasury. This annual interest charge will be about £50,000,000 besides the accumulated interest amounting to \$500,000,000.

The report of the foreign trade of the United States for the month of October showed that exports increased by approximately \$21,000,000, while imports gained about \$4,000,000 as compared with the previous month. The total of October exports was \$346,000,000 as compared with \$325,000,000 in September, while October imports amounted to \$183,000,000 as against \$179,283,000 for September. The excess of gold imports at \$39,558,265 compared with \$64,066,492 in the month of September and was the lowest for any month since January. The Official Crop Report of the United States for Nov. 1 indicated that the harvests of all the leading crops are less than for 1920, an aggregate loss of fully 640,000,000 bushels as compared with a year ago being reported.

## BUS SERVICE IN SPOKANE

LANSING, Nov. 16—The Olds Motor Works has received an order from the city of Spokane for 16 Oldsmobile truck chassis. The trucks will be shipped at once and will be used by the city as the nucleus of a municipal bus service which will aid in facilitating the handling of passenger traffic within the city.



## MEN OF THE INDUSTRY

**Clyde P. Brewster**, active in the automotive industry from its early days, has been elected vice-president and general manager of the Express Spark Plug Co., of Alexandria, Va. He started in 1905 as branch manager of the Jones Speedometer Co. of Chicago and in 1911 became Philadelphia branch manager of the Stewart-Warner Speedometer Corp. Four years later he joined the Edward A. Cassidy Co., Inc., of New York, as district representative, soon being appointed Detroit branch manager. Following the war he became associated with the Lyons Storage Battery Co., Philadelphia, of which he became sales manager in 1920.

**Clifton Slusser**, superintendent of the Goodyear California Co., has been transferred to the Akron Goodyear factories to assist vice-president and factory manager Paul Litchfield, in revision of staff department personnel. **Harry Blythe**, personnel director at Akron has been assigned to California in Slusser's place. Whether the change is to be permanent, has not been announced.

**F. L. Ryan** has been appointed Pacific Coast manager of The India Tire & Rubber Co. of California, distributing branch of The India Tire & Rubber Co. of Akron. Ryan was at one time manager of the Sacramento branch of the B. F. Goodrich Co. and later was sales manager of the Goodrich Los Angeles branch. He will make his headquarters in San Francisco.

**Robert G. Elwell**, formerly general manager of sales and advertising for the Allen Motor Car Co., Columbus, has become assistant sales manager of the Auburn Automobile Co., Auburn, Ind., and will share in the work of Charles M. Strieby, also assistant sales manager. Elwell will look after merchandising and advertising.

**Keith Lindsay Morgan**, formerly with the Colt-Stratton Co. and later with the Kelsey Motor Co., is now associated with Wilson K. Farrington, New York, and will specialize in direct mail advertising, particularly as it can be applied to the selling of such products as motor cars, trucks, tractors, equipment and machinery of all kinds.

**Truman Berry** and **Charles Sanderson**, Whittier, Calif., have been elected to the board of directors of the Leach Motor Car Co. of Los Angeles to fill vacancies. Berry has been allotted distributor's territory in Orange county, California, and vicinity for the Leach Biltwell car.

**Henry M. Lewis**, formerly sales engineer with the Hyatt Roller Bearing Co. has joined the Klaxon sales organization with territory covering the eastern territory, including New York, Pennsylvania, Delaware, New Jersey, Maryland and the District of Columbia.

**James M. Clarke**, sales manager of the National Motor Car Co., Indianapolis, has resigned and moved to Boston where he has taken an interest in the company handling the National and the Earl Motors product for New England.

**George B. Hendrick**, publicity manager for the Fisk Rubber Co., has been elected vice-president of the Massachusetts Chamber of Commerce and will give his entire time to that work.

**William W. Shepherd** who for 15 years has been in the automobile advertising field, has joined the Class Journal Co. He will make his headquarters in Chicago.

**William H. Edwards**, formerly collector of internal revenue in New York City, has been

elected a director of the Keystone Tire & Rubber Co.

**C. A. Engelman** has been appointed assistant sales manager of the New Era Spring & Specialty Co., Grand Rapids.

**E. H. Fitch**, formerly with the Goodrich Tire & Rubber Co., has been appointed manager of the Republic Rubber Corp.

**Thompson Auto Co.**, Detroit, distributor of Maxwell and Chalmers, will also distribute the Rolls-Royce in that territory.

**A. R. Erskine** has been elected president of the Board of Lay Trustees of the University of Notre Dame, succeeding Dr. William P. Breen.

Higher Priced Cars Gain  
in New York Territory

NEW YORK, Nov. 15—Registrations of new passenger cars in the metropolitan district fell off in October 404 from the September record. Figures just compiled by Sherlock & Arnold, publishers for dealers of the *Automobile Sales Analysis*, show a gain in higher priced cars, of which 426 were registered in October, to 331 in September, but the medium and low priced registrations dropped off from 4004 to 3595. The totals were 4334 in September and 3931 in October.

The high month of the year was June, with 7017 registrations.

The figures are for ten counties in and around New York City.

The summary of the year, to date, follows:

	Approx- imately below \$2,500	Approx- imately above \$2,500	Total
January .....	483	146	629
February .....	1,409	210	1,619
March .....	3,396	488	3,884
April .....	4,811	575	5,382
May .....	5,468	584	6,052
June .....	6,522	495	7,017
July .....	5,457	386	5,843
August .....	4,216	350	4,566
September .....	4,004	331	4,335
October .....	3,505	426	3,931
Total to date .....	39,307	3,990	43,297

Treasury Extends Time  
to File Amended Returns

WASHINGTON, Nov. 16—Extension of the time for filing amended returns in cases in which appreciated or inflated values have been used in determining invested capital will undoubtedly prove a boon to automobile manufacturers and dealers. Secretary of the Treasury Mellon has extended the time for filing amended returns and making payments of additional taxes due Jan. 15, 1922.

Under the provisions of Treasury Decision 3240, tax payers who had included appreciations in their income and profits taxes for 1917 and subsequent years were required to file amended returns within ninety days and pay the additional taxes. There were many appeals from the automobile industry to the effect that it would be impossible to make payments at this time. In some cases the additional amount due the Government exceeded \$100,000 and it was manifestly impossible to raise this cash by Nov. 24.

## FINANCIAL NOTES

**Stewart-Warner Speedometer Corp.** in a comparative balance sheet as of Sept. 30 shows assets of \$23,385,353, as compared with \$21,321,226 Dec. 31, 1920. Cash on hand on the former date amounted to \$1,014,169, as against \$32,854 on the latter date. Notes and accounts receivable were \$1,693,640, compared with \$1,528,648 Dec. 31. Inventories on Sept. 30 totaled \$2,671,446, as against \$3,998,697. Among the current liabilities accounts and vouchers payable on the September date were \$187,791, and on the last of the year \$312,407. The surplus Sept. 30 was \$7,961,124 and on Dec. 31 \$8,041,938. On the former date the net assets applicable to the 473,815 shares (no par) of capital stock amounted to \$10,953,050, or \$23.12 per share, after deducting patents, trademarks, good-will, etc., carried at \$9,439,124, or \$19.92 per share.

**Federal Motor Truck Co.** sales were \$400,000 in October. Third quarter shipments were 35 per cent greater than second quarter shipments and the final quarter of 1921, based on the October record, is expected to be twice the total sales during the second quarter. A comparison of the company's condition Nov. 1, 1921, with Dec. 31, 1920, shows that on the former date assets totaled \$3,695,767 and on the latter \$4,525,340. Cash and securities on Nov. 1 were \$288,876 and on Dec. 31 \$355,798; accounts receivable on the former date \$270,866 and on the latter \$228,310. Among the liabilities, notes and acceptances Nov. 1 amounted to nothing and on Dec. 31 \$352,734, while accounts payable on the date this year were \$63,046 and none on last year's date. The surplus on Nov. 1 was \$778,732 and on Dec. 31 \$806,812.

**Kelsey Wheel Co.** has been operating close to capacity since June and indications are that high schedules will be maintained through the balance of the year. Since operations in the first half were not greatly curtailed, it is likely that earnings for the full twelve months of this year will exceed last year's record net profits of \$1,916,000, which, after charges and preferred dividends, were equal to \$17.25 a share on the \$10,000,000 common stock outstanding. It is estimated that directors will consider an initial dividend on the common stock in the near future.

**Reynolds Spring Co.** has declared a quarterly dividend of one and three-fourths per cent on its preferred A stock, payable Dec. 31, to stockholders of record at the close of business on Dec. 22, 1921.

**Wayne Oil Tank & Pump Co.**, Fort Wayne, has issued its ninety-first common stock dividend.

Bill to Prevent Seizure  
of Cars Delayed in House

WASHINGTON, Nov. 16—Filibusters against the Willis-Campbell anti-beer bill in the Senate have delayed the enactment by the House of the Dial bill, which is of particular interest to automobile dealers as it provides for the protection of their equity in motor vehicles in the event of seizure for illegal transportation of alcoholic beverages. The Dial bill was passed by the Senate several months ago. It provides that an innocent party to a seizure for bootlegging should not lose whatever equity is involved in the car.

# Calendar

## SHOWS

- Nov. 14-19—Jersey City, Second Annual Automobile Show of Hudson County Automobile Trade Association, Fourth Regiment Armory.
- Nov. 27-Dec. 3—New York, Automobile Salon, Hotel Commodore.
- Jan. 28-Feb. 4—Chicago, Automobile Salon, Hotel Drake.
- Jan. 7-13—New York, National Automobile Show, Madison Central Palace, Auspices of N.A.C.C.
- Jan. 28-Feb. 4—Chicago, National Automobile Show, Coliseum, Auspices of N.A.C.C.
- Feb. 6 to 11—Seventh National Tractor Show and Educational Exposition, Minnesota State Fair Grounds, Minneapolis.
- Feb. 6 to 11—Winnipeg, Can., Automotive Equipment Show, Western Canadian Automotive Association.

Feb. 20 to 25—Louisville, Ky., Louisville Automobile Show, Auspices Louisville Automobile Dealers Association.

## FOREIGN SHOWS

- Nov. 12-27—Buenos Aires, Annual Motor Show, La Pabellon de las Sosas, Automovil Club Argentino.
- Nov. 26-Dec. 3—Shanghai, China, Automobile Show.
- Nov. 28-Dec. 3—London, Motorcycle Show.
- Dec. 3-14—Brussels, Belgian International Automobile Show.
- March, 1922—Santiago, Chili, Annual Automobile Show.
- May, 1922—Quito, Ecuador, Agricultural Exposition, celebrating Centenary of Ecuador, Automotive Section.
- Sept. 1922—Rio de Janeiro, Brazil, Automobile exhibits in connection with the

Brazilian Centenary Association Automobilista Brasileira.

## CONVENTIONS

- Nov. 14-19—Chicago, Annual Meeting and Business Exhibit of Automotive Equipment Association.
- Nov. 21-23—Atlanta, Third Annual Convention of American Farm Bureau Federation.
- Dec. 6-8—Chicago, Second Annual Meeting of American Petroleum Institute.
- Dec. 10—New York, American Institute of Mining and Metallurgical Engineers.
- Dec. 20—Philadelphia, American Society of Mechanical Engineers.
- Dec. 27-29—Chicago, American Society of Agricultural Engineers, Auditorium Hotel.
- Jan. 17-20, 1922—Chicago, American Road Builders Association.

Jan. 30-31—Chicago, Fifth Annual Convention, N. A. D. A., La Salle Hotel.

Jan. 30-Feb. 2—Boston, Sixth Annual Conference of the International Delivery Association, Copley Plaza Hotel.

June 11-15—Milwaukee, Annual International Convention of the Associated Advertising Clubs of the World.

Sept. 18-23, 1922—Rome, Italy, Second Annual Meeting of the International Chamber of Commerce.

## S. A. E. MEETINGS

- Detroit, Nov. 18, Dec. 23, Feb. 24, March 24, April 23, May 26.
- New York, Jan. 11-14, 1922—Annual Meeting.
- Chicago, Feb. 1
- Minneapolis, Feb. 8—Tractor Meeting.

## Railroad Replaces Trains With Buses

### California Company Will Operate Over Routes Where Tracks Are Laid

SAN FRANCISCO, Nov. 16—The Pajaro Valley Railroad Co., operating between Spreckels and Salinas, has entered the motor bus field in an attempt to replenish its treasury and to make up for some of the losses suffered in competition with motor bus and motor truck lines in that section.

With the granting by the California State Railroad Commission of permission to operate motor buses instead of certain trains over its lines, the Pajaro Valley Railroad becomes the first rail line in the State to enter the field of automotive vehicle operation.

At the hearing on its application for permission to substitute motor buses for certain of its trains, the railroad company's representatives showed that it is and has been for some time losing money, and that the operation of these motor passenger vehicles would replenish the treasury. Accordingly, permission to operate passenger, express and freight service by motor cars was granted to the company, on condition that the same rates charged for train service should apply to the automobile service.

A few permits have been granted in California to operate motor bus and truck lines as auxiliaries to the regular rail service, but never before to operate them over routes where tracks had been laid, and over which regular train service was to be discontinued in favor of the motor service.

## HINKLEY INCORPORATES

DETROIT, Nov. 15—Incorporation papers have been filed by Hinkley Motors, Inc., which will take over all the

assets of the Hinkley Motors Corp. which were sold by the trustee on Nov. 2. The new corporation has taken a long lease on the recently completed Hinkley plant in Ecorse and will begin production of Hinkley motors immediately. The board of directors is composed of C. C. Hinkley, president; Leon Alvarez, vice-president and secretary; Henry M. Butzel, treasurer; Fred J. Fisher, Charles T. Fisher, Louis Mendelsohn and Aaron Mendelsohn.

## Commercial Car Added To Line of Dort Motors

FLINT, Nov. 15—The Dort Motor Car Co. has added a commercial car to its line, the same to be placed on the passenger car chassis with heavier springs.

The new model is built to carry 1000 lb. and is offered as a chassis with lamps, lamp brackets, front fenders, running boards, radiator, hood, windshield, seat frame, cowl board and body to rear of front seat at \$685; with driver's cab and curtains added, \$715; with cab, curtains and all-steel express body, \$780, and with cab, curtains, express body and canopy top at \$825, all f.o.b. factory.

## To Move North American Factory to Springfield

SPRINGFIELD, MASS., Nov. 14—Tire factories in this district are operating at capacity. The Adirondack Tire Tube Co., which plans to absorb the North American Process Co., purposes to move the production of the last-named company's tires from Malone, N. Y., to Springfield.

Paramount Rubber, Consolidated, which holds important patents on seamless rubber goods, is considering a proposal to unite with the two concerns named in building a plant here. Construction plans, as discussed in conference here, call for a factory of about 75,000 feet floor space.

## Dallas Is Expecting November Increase

### All Automotive Lines Share in Improvement During Past Month

DALLAS, Nov. 15—More than 950 automobiles were sold by Dallas retailers during the month of October, of which number more than 800 were new cars. The value of the business done was approximately \$1,275,000. The business transacted by the wholesale dealers, according to the best figures available for the month, was about twice that of the retailers. October sales included more than 100 cars sold at more than \$3,000 and between 50 and 75 selling at from \$3,500 up.

The retail automobile dealers are of the opinion that actual sales for November will equal or surpass those of October. At present the indications are there will be a 10 per cent increase in the retail sales during this month.

The October truck business showed an increase, dealers say, and add that indications are that November sales will be still better.

Automobile dealers and farm implement concerns handling tractors declare the October business in that line was much better than that of the preceding month. They claim the sales thus far in November are exceeding those of October. No figures were available for the actual number of tractors sold by Dallas dealers during the month of October.

## HUNT JOINS CHEVROLET

DETROIT, Nov. 16—O. E. Hunt has been appointed chief engineer of the Chevrolet Motor Co. He will have general supervision of engineering in all Chevrolet plants. Hunt formerly was connected with Packard and Hares Motors.